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PATIENT/NURSE CALL SYSTEMS

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Patient/Nurse Call Systems

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I. Introduction

1. The present trend in hospital design favouring ward units divided into rooms or bays containing a small number of beds has reduced patients' opportunities for making verbal contact with nursing staff and, by so doing, created a greater need for communication aids. In many wards in National Health Service hospitals such communication is still entirely oral. In others contact is established and the source of a patient's call identified by a system of indicator lamps and/or electric bells and buzzers operated by a push at each bedhead (non-auditory systems) while, in recent years, systems providing a direct speech connection between each bedhead and nursing staff on duty by means of electronic intercommunication equipment (auditory systems) have been developed and introduced into a number of N.H.S. hospitals. All the installations of the latter type traced during the study were in wards where the beds were located in small groups or single rooms. The installed cost of these systems varies with the facilities required, non-auditory costing between £11 and £35 and auditory between £45 and £60 per bed although one manufacturer offers a simplified version of the latter for about £30.

2. Considerable interest has been shown by some hospital authorities in auditory as distinct from non-auditory systems. The following advantages are claimed for the former:

(i) Hearing a voice promising the necessary attention within a short time of making a call is reassuring to patients, particularly to those in small wards where a feeling of isolation is not uncommon.

(ii) If a patient's call necessitates a visit but is not of an urgent nature the responding nurse, if more importantly engaged at the time, can use the system to assure the patient that the necessary attention will be forthcoming and postpone actually visiting to a more convenient time.

(iii) Nursing time can be saved because knowing the patient's requirements without the need to go to the bedside enables the responding nurse to answer certain types of call without a visit and, if a visit is necessary, to collect *en route* any equipment likely to be required.

(iv) Although primarily intended for patient to nurse communication, provision can also be made for nurse to patient and nurse to nurse calls enabling a further saving of nursing time to be achieved.

3. On the other hand it has been claimed:

(i) Auditory systems tend to weaken the traditional nurse/patient relationship because of the rather impersonal nature of this type of communication.

(ii) Instructing patients in the use of the equipment is time-consuming particularly in wards dealing mainly with short-stay cases.

(iii) Patients' use of a call system is normally greatest when they are confined to bed which is often during their first few days in hospital when they are least familiar with the equipment and therefore least able to use it satisfactorily.

4. In order to provide guidance on the different systems, the Central O. and M. Unit were asked to undertake a study of the uses of patient/nurse call systems and their application in the Hospital Service. The following terms of reference were adopted:

1. To determine call system requirements in hospitals.
2. To consider how far the present range of equipment and systems available from manufacturers meets these requirements (excluding ancillary features such as radio sound distribution, power points and over-bed lights which are often integrated with call systems).
3. To specify a system that would meet the needs most effectively.

Scope of the study

5. Visits were made to wards in twelve hospitals where either auditory or non-auditory call systems have been installed. The layouts of the wards chosen were representative of those normally encountered in hospitals and covered most of the specialties. As a result of these visits six wards, where the level of call system activity appeared to justify further study, were selected for detailed observation and on five others where the usage was rather less it was arranged that the staff should take a count of calls made by patients. At the remainder where even less use was made of the systems, inquiries were directed to obtaining details of the installations, usage and the reactions of staff and, where possible, patients to the systems provided.

6. This report describes the call systems currently available from manufacturers, gives the results of the individual studies and the conclusions which appear to emerge from them, and specifies a call system which appears to meet the requirements identified most effectively. The wards selected for study provided a fairly full coverage of specialties but did not include psychiatric and children's wards, day patient accommodation and out-patient, accident and emergency departments, so that the conclusions reached will not necessarily apply to these types of accommodation. The assistance given during the study by hospital authorities and staff, and by manufacturers, is gratefully acknowledged.

Results of the study

7. The main conclusions reached may be briefly summarised as follows:

(i) Auditory systems enable an earlier indication to be given to patients that calls made will be answered than non-auditory systems do and in this respect may provide greater reassurance, but do not enable a nurse to reach a calling patient's bedside any sooner.

(ii) Nursing staff seldom use the two-way speech facility to assure a calling patient whose request is not urgent that the necessary attention will be forthcoming, and postpone actually visiting to a more convenient time.

(iii) The saving of nursing time achieved by the use of auditory call systems for patient to nurse, nurse to patient, and nurse to nurse communication is negligible, principally because the opportunity to make savings is limited by the small use made of call facilities.

(iv) There is a need for call facilities in all types of wards covered by the study irrespective of layout. None of the systems in use or available appears entirely to meet the need and in the final section of this report is specified a system, basically non-auditory, to meet the requirements identified during the study.

II. Equipment and systems available

Non-auditory systems

8. These systems normally provide for a patient to initiate a call from the bedhead by pressing a wall push or hand-held pear push which causes a light (reassurance light) within the patient's field of vision to come on. Similar call facilities are usually provided in the other parts of ward units used by patients, namely bathrooms, w.c.'s, treatment rooms and day rooms. Any calls made are indicated to the nursing staff by lights or by lights and buzzers sited to provide a complete coverage of the ward unit. Calls are cancelled by pressing a reset push which is located either within the patient's field of vision or close to the calling point, to ensure that all calls made are answered by a visit. A reassurance light does not, of course, indicate that a call is being or will be answered but only that the equipment is switched on and, barring a number of separate faults in other parts of the system, the associated call indicator devices are working.

9. The location of the call indicator lights will depend on the layout of the ward unit. In open wards it may be possible with suitable siting for the reassurance lights to serve also as call indicator lights. In ward units where patient accommodation is provided in rooms containing single or small groups of beds a call indicator light is normally sited in the corridor over each door. Where the layout of the ward unit prevents all over-door lights from being seen from all positions in the corridor(s), further groups of indicator lights (section lights) are usually provided to indicate the part of the ward in which calls originate. These are sited so that at least one group can be seen from any position in the corridor(s). Over-door lights are also provided for day rooms, treatment rooms, bathrooms and w.c.'s, and, where the patients' toilet facilities are grouped, additional indicator lights may be located over the doors of the individual cubicles if it is not possible to install the reassurance lights in positions readily visible to both the calling patient and the responding nurse.

10. Buzzers are normally incorporated to give an audible indication of calls made in all parts of the ward unit. This is important because the coverage of the over-door, reassurance and section lights is usually limited to the corridor(s) and the room in which the call originated. Provision is often made for reducing the volume of sound produced by buzzers at night to decrease the risk of disturbance to patients. Muting the buzzers entirely would, of course, result in incomplete coverage of the ward unit unless, for example, a further series of call indicator lights were switched into circuit in those parts of the ward covered by buzzers during the day. This particular problem has been solved by at least one manufacturer by muting the buzzers at night and connecting the call system to an induction loop staff location system which provides an audible indication of calls made in a pocket paging receiver carried by one of the nurses on duty. The use of buzzers at night was an occasional cause for complaint by patients on some of the wards visited.

11. Hand units providing, for example, a selector switch and volume control for radio and TV sound and an over-bed light switch, as well as a call button and reassurance light, are available to meet the needs of patients who are incapable of the movement necessary to operate the controls on a bedhead wall unit but who could manage and would appreciate these facilities. Such units are normally connected by a multi-channel cable and plug to a suitable outlet in the bedhead wall unit.

Emergency calls

12. To enable a nurse to summon the assistance of a colleague if an emergency arises which prevents the nurse leaving the patient concerned, a separate push is normally provided in the wall unit at each bedhead, in day rooms, treatment rooms, bathrooms and w.c.'s.

13. An emergency call made during the daytime normally causes the over-door and section lights to

flash, and the buzzers to sound in a manner readily distinguishable from the normal call tone. At night if the buzzers are switched off emergency calls are signalled either by arranging for all the indicator lights used to signal night calls to flash or, if a staff location system is in use, by causing only over-door and section lights to flash and providing a second paging receiver on each ward. The two receivers are carried by two nurses on duty and provide them with an audible indication of normal calls from patients and emergency calls originated by each other or any other nurse on duty. The signals produced by the paging receivers when indicating emergency and patients' calls are readily distinguishable. A reset push to cancel emergency calls is required for each location or group of locations from which such calls can be made.

Transfer of emergency calls

14. If a ward is likely to be staffed by only one nurse at any time of the night or day—a position that usually only occurs at night during meal breaks —switching can be provided to transfer emergency calls to another locality where nursing staff are on duty. Where a staff location system is in use for signalling night calls it is, of course, necessary to deposit one of the two paging receivers with the nurses to whom calls are to be transferred.

Nurse presence indication

15. Additional over-door lights (usually a segment of a dome light which may also incorporate the patients' call light and emergency call light) can be provided to indicate the whereabouts of nursing staff in the ward. A nurse entering a room on the ward presses the "presence" push by the door which causes the appropriate over-door light to come on; a separate push is provided to enable the nurse to cancel when she leaves. Separate but similar facilities can be provided to indicate the whereabouts of the ward sister.

Call indicators

16. Call indicator panels, with a separate light for each calling point or group of calling points used by patients, are available and, where installed, are normally located at the duty station on the ward or in the ward sister's office to provide identification of the source of calls made, without having to refer to over-door or section lights. Additional lights can be provided on the panels to work in conjunction with a "nurse presence" system so that the whereabouts of nursing staff on the ward may also be known centrally.

Auditory systems

17. The systems currently available fall into two main categories:

(1) those that retain the usual features of a non-auditory call system and provide in addition two-way speech communication between each bedhead and a single reply point provided for staff at a central position in the ward, usually the nursing station;

(2) those that provide two-way speech communication between each bedhead and a number of reply points provided for staff at intervals in the corridor(s), at the nursing station and other staff rooms depending on ward layout, with non-auditory call facilities only in w.c.'s, bathrooms, day rooms and treatment rooms.

18. With the first type of system mentioned a nurse responding to a call made from the bedhead has to decide, depending on her position in the ward at the time in relation to that of the calling patient, whether to reply orally from the central reply point or to proceed direct to the patient. No such decision is required with the second type and the responding nurse has to go to the nearest reply point even though this may take her farther away from the calling patient's room. Both types of auditory system normally include only non-auditory call facilities in w.c.'s, bathrooms, treatment rooms and day rooms although two-way speech communication can be provided if required at any of these locations.

Auditory systems with single reply point

19. The speaker/microphones provided for patients at the bedhead are either incorporated in the wall units, fixed to the lockers, mounted on swivel arms or fitted into hand units connected into wall or locker units. The other call system features normally found at the bedhead are patients' and emergency call pushes and reassurance lights. Calls are indicated as in non-auditory systems, by buzzers, over-door and, where required, section lights. The unit at the central reply point—usually referred to as the central control unit—consists basically of a call indicator panel with a separate light for each calling point in the ward, a speaker/microphone and the switching required to connect the individual speaker/microphones at the bedheads with the one at the central point and control the conversation.

20. Calls are cancelled by reset pushes sited, as in the case of non-auditory systems and for the same reason, close to the calling points. However, because the nursing staff can use the two-way speech facility at the central control unit to ask the purposes of patients' calls and in some cases can meet patients' requests without a visit, provision is normally also made for cancelling calls at the central unit to save nurses unnecessary walking to the normal reset pushes.

21. The emergency call and transfer facilities outlined in paragraphs 12, 13 and 14 of this report can be provided with this type of auditory system.

22. Provision can also be made for a nurse at the central control unit wishing to speak to a patient to initiate a call to the appropriate bedhead unit. Nurses in the ward can, of course, use the patients' speaker/microphones at the bedheads to speak to the

operator at the central unit although this involves originating a call indistinguishable from one made by a patient. This is, generally, only satisfactory if the central unit can be staffed continuously and staff are aware that all calls will be answered from it, otherwise another nurse in the vicinity of the calling nurse may waste time tracing such a call by the indicator lights. Alternatively additional speaker/microphones can be provided, as required, on the walls of the rooms in a ward unit to enable staff to communicate with the central unit and vice versa without activating the system's buzzers and indicator lights, and to provide facilities for paging and making general announcements on the ward from the central unit.

23. Where the " nurse presence " facility is included in an auditory system of this type the provision of wall-mounted speaker/microphones for staff use can increase its flexibility in the following respects:

(1) A call transfer key can be provided on the central control unit which is depressed when the operator is absent and causes all patients' calls to be indicated by a special call signal produced in the wall-mounted microphone/speakers in all the rooms where " nurse presence " has been signalled. This not only provides an audible indication of calls made in the actual rooms where nurses are known to be, but also indicates to them that the central unit is unstaffed and that the patient will not be answered from that source. As a safeguard against the operator leaving the central unit but not depressing the call transfer key, provision can also be made for all calls to be relayed as if it had been depressed if a reply is not forthcoming from the operator within a given period.

(2) The operator at the central unit knowing the whereabouts of the nursing staff by the " presence " lights on the central control unit can, when a visit from a nurse is required to answer a call, ask the nurse indicated as being nearest to a calling patient to respond.

24. Without the greater flexibility provided by the " nurse presence " facility the nurse at the central control unit either has to go herself or ask a colleague close at hand to do so when a visit to a patient is necessary. With this facility included it is never normally necessary for the nurse at the control unit to go and it is therefore no longer essential for the unit to be installed on the ward. This has led to one manufacturer providing a central control unit to cover a group of wards (or even a whole hospital) which overcomes the difficulty normally experienced on individual wards of staffing the central unit continuously and enables the call system to be used for staff intercommunication between wards and even departments, if linked to the system. The latter communication links are, of course, normally provided in hospitals by an automatic internal telephone system providing direct contact which must generally be preferred to the manual alternative offered by this method.

25. Facilities can be provided to enable the nurse at the central control unit to listen-in to sounds made by patients as picked up by the bedhead speaker/microphones. It is usual to indicate to a patient that sound monitoring is in progress by arranging for the reassurance light to come on. Although a number of the wards visited during the study had this facility, in all cases practically no use at all was being made of it because it was considered that this form of monitoring gave an incomplete and therefore unreliable indication of a patient's condition.

Auditory systems with multiple reply points

26. These provide the usual call system features at each bedhead, namely speaker/microphone, call and emergency pushes and reassurance light. All calls are indicated by buzzers and the nursing staff are able to reply orally to calls made by patients from their beds by using any one of a number of telephone handsets or speaker/microphones (reply points) provided at regular intervals in the corridors, at the duty station and in other staff rooms as required. Normal non-auditory call facilities are usually provided for bathrooms, w.c.'s, day and treatment rooms, and although the system of over-door and section lights covering this part of the ward can be extended to include the bed accommodation, this was not done in the installations seen during the study. Calls from the beds are cancelled at the reply points to enable the responding nurses to dispense with visits whenever possible, and those from rooms with non-auditory facilities by reset pushes adjacent to the calling positions.

27. A call indicator panel with a separate light for each calling position can be provided at each reply point. This is an important feature where over-door and section lights are not provided to identify the source of calls made from the beds, because any patients who fail to identify themselves when using the speaker/microphones because they are unfamiliar with the equipment, reluctant to use it or even too unwell to do so, could not otherwise be readily traced.

28. The emergency call facility is available with these systems and although all the features referred to in paragraphs 12, 13 and 14 of this report were not incorporated in any installation of this type seen during the study, there appears to be no technical difficulty in doing so. Provision can also be made at the reply point at the duty station for sound monitoring of patients and for initiating staff to patient calls.

29. The " nurse presence " facility which can be provided with auditory systems with a single reply point to enable the nurses' visits in response to patients' calls to be controlled centrally is not provided with this type of installation and, in practice, it is almost invariably the nurse who replies orally to the calling patient at one of the reply points who also deals with the request. With the " nurse presence "

facility it is possible for the central control unit operator to choose the nurse nearest to the calling patient to answer. Without it it is a matter of chance how close the responding nurse is to the calling patient so that a nurse could walk the whole length of a ward unit in response to a call although, in fact, some or all of the other nurses on duty might be closer to the calling patient at the time.

III. Conduct and evaluation of studies

30. The preliminary visits showed that although the hospital authorities concerned were unanimous in their selection of non-auditory systems for open wards irrespective of specialty, the same unanimity did not exist when providing systems for wards in which the beds were located in small groups or single rooms. As an example of this, three of the hospitals visited had medical and surgical wards consisting mainly or entirely of single rooms and had installed non-auditory, auditory (with single reply point) and auditory (with multiple reply points) systems respectively.

31. There seems no doubt that non-auditory systems meet adequately the requirements in open wards although in no case did the facilities included in the installations studied meet all the needs identified subsequently. Patients seldom need to use the call systems in such wards at all during the daytime because they normally have no difficulty in attracting the attention of nurses who are almost continuously present in the areas used by patients. During the night when fewer nurses are on duty and there is less movement by those on duty about the wards, the number of calls made usually increases slightly but is still small. Because so few calls are made the opportunity for nursing staff to save time if an auditory system were installed would be correspondingly small and, in practice, only an insignificant saving could be expected. For obvious reasons, too, patients in open wards are usually much less prone to a feeling of isolation than those in small wards and, in this respect, have less need of the reassurance that, it is claimed, an auditory system provides because calls are answered more promptly.

32. Attention was concentrated therefore during the next and the main stage of the study on wards with beds located in small groups and single rooms, and the six wards selected for detailed observation and the five for a count of calls were, in fact, all of this type. To provide a balanced coverage of the three main types of call system available, two of the six selected had non-auditory call systems and the remainder auditory systems, two with a single reply point and the other two with multiple reply points. Those where the studies were restricted to a count of calls also included the three types of call system. The results of these studies are set out in detail in appendices A to F and G to K respectively.

33. The use made of the call systems on each of the six selected for detailed study was observed continuously for a period of 63 hours (87 hours in one case) to provide the following information:

(1) the number of calls made by patients and staff;
(2) the result of calls made;
(3) the time taken by nursing staff to answer calls from patients and staff;
(4) the purpose of calls made by patients and staff;
(5) the walking distance/time saved or lost by nursing staff attributable to the use of the auditory facility when answering calls from patients or staff (auditory systems only);
(6) other factors affecting the use of the call system, e.g. bed occupancy, the number of nursing staff on duty, the number of ambulant patients and nursing practice.

34. With the exception of sub-paragraph 33(5) the information categories are self-explanatory. The method used to calculate the walking distance/time saved or lost by nursing staff when answering patients' calls with the aid of the two-way speech facility was to measure the distance actually walked by the responding nurse on each occasion and compare it with the distance she would have had to walk to answer the same call had the ward been fitted instead with a fully effective non-auditory system. An average walking speed of 4 m.p.h. was assumed to convert walking distance to time. The following examples are given to illustrate the method employed:

Example 1—A nurse replies from the central control unit at the nurses' station (A) to a patient calling from bed (B) who asks for a glass of water which the nurse obtains from the ward kitchen (C). Because the nurse has learned the patient's requirements without having to visit the bedside the total walking distance involved in completing the errand is the sum of the distances from A to C and from C to B. If, however, there had been a non-auditory system on the ward the nurse would have had to go initially to the bedside to enquire the purpose of the call before going to the kitchen, and in this case the walking distance involved is the sum of the distances from A to B, B to C and C to B. The saving to the nurse in this case is the amount by which the hypothetical walking distance calculated for the non-auditory system exceeds the actual distance for the auditory system.

Example 2—A nurse replies from the central control unit to a patient who asks for details of visiting hours. The nurse provides the information asked for using the two-way speech facility and, because the visit that would be required if a non-auditory system were installed is not made, the saving is twice the distance between the central control unit and the patient.

Example 3—A nurse replies from the central control unit to a patient who asks to have a window closed. In this case a visit is necessary but because the responding nurse is not required to collect any article *en route* no saving is effected.

35. A few calls of the type described in example 3, made during the studies on the two wards which had auditory systems with multiple reply points, resulted in the responding nurses actually walking a greater distance than they would have done had a non-auditory system been installed because they went to reply points which took them farther away from the calling patients.

36. For staff to staff, and staff to patient calls made with the use of the two-way speech facility it was assumed that had the facility not been available the caller would have made a return visit to the person communicated with on each occasion, so the walking distance saved in each case was reckoned to be twice the distance between them. It is very unlikely that in the absence of an auditory system all such messages would have been communicated by a series of isolated return visits as this method of assessment assumed, so that the savings attributed to the auditory systems in respect of staff calls are unlikely to be fully realised in practice.

Number of calls

Patients' calls

37. As was to be expected there was a wide variation in the number of calls made by each patient. Anxious or disturbed patients were the principal users but, with very few exceptions, there was no evidence of any tendency towards the making of unnecessary calls. Indeed the impression gained was that most patients were reluctant to make other than essential calls in order to avoid adding unnecessarily to the work of the ward staff. The data provided by the studies on the extent of call system usage is summarised in Table 1 which also includes estimates of usage provided by nursing staff before the studies began. The estimated and actual figures correspond fairly closely which suggests that the results were generally representative of the wards studied.

38. Table 1 shows that patients in single-bed rooms made most calls and that where the beds were located in larger groupings the number dropped substantially. This was to be expected because as a rule patients in single rooms see nurses less frequently than those in larger bed groupings; they have a greater feeling of isolation and normally have no opportunity to ask for the help of an ambulant patient.

39. Fewer calls were made during the night than during the day on those wards where the beds were in single rooms or small groups because most of the patients were asleep. The position was reversed on the wards used for studies I, J and K because of their larger bed groupings. The reasons for this difference in usage pattern were given in paragraph 31.

40. It was the policy on all the wards studied to encourage patients to get up during the day when their condition permitted it. For the purposes of the studies only those patients able to visit the wards' sanitary annexes unassisted were classified as ambulant and these were observed to make very little use of the call systems. The effect of a high percentage of ambulant patients was demonstrated by study D which, although conducted in a ward consisting mainly of single-bed rooms produced a usage figure substantially below that for the ward with a similar layout used for study B. A further contributory factor in this case was the provision of sanitary rounds after meals for patients confined to bed on the ward used for study D and not for those on the ward used for study B.

41. Sanitary rounds were also provided on the wards used for studies E, F, I, J and K, and this partly accounted for the higher usage revealed for H, although the other contributory factors in this case were the comparatively small number of ambulant patients and the fact that it was a female ward. The nursing staff consulted during the studies confirmed that female patients generally require more attention and therefore make more calls than male patients. It might have been expected that the ward used for study G which was identical in layout to that used for H would have a similar usage. That it did not was probably mainly attributable to the higher proportion of ambulant patients at the time and the fact that it was a male ward.

42. There was also an appreciably smaller usage on the ward used for study B than on those used for A and C, although all three had similar layouts. The only apparent difference was that the patients in the former were not fee-paying and in the latter two were private patients (Section V beds). The reasons for some of the calls made by the private patients suggested a desire for more personal service than was expected by those in study B.

43. It can be concluded from the studies made that patients in wards with single-bed rooms can be expected to average between two and four calls daily and those in wards with larger bed groupings less than one, although usage is considerably influenced by the factors mentioned. It is perhaps interesting to record that a study on similar lines conducted in the U.S.A. on four wards with a total bed complement of 154 located in 62 single, 2 two-bed and 22 four-bed rooms revealed that patients were making an average of 6·2 calls each daily.*

*Yale Studies of Hospital Function and Design. United States Public Health Service Grant, W.53.

TABLE 1

	Appendix										
	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*
Accommodation (e.g. two single-bed rooms shown as 2×1; three two-bed rooms as 3×2, etc.)	18×1 1×2	18×1 2×2	16×1	18×1 6×2	7×1 17×2 2×4	9×1 3×2 1×3 1×4 1×6 1×13	5×1 2×2 4×4	5×1 2×2 4×4	+2×1 +1×6 °1×15	+2×1 +1×8 °1×15	4×1 2×2 1×3 1×6 1×15
Call system (note 1)	A/S	N/A	N/A	A/M	A/M	A/S	A/M	A/M	+A/S °N/A	+A/S °N/A	N/A
Average bed occupancy	18·5	20·0	15·3	28·6	33·2	27·7	19·0	15·3	19·8	21·7	28·8
Average number of ambulant patients	7·0	8·5	7·0	20·2	20·1	20·3	13·0	7·6	About 13	About 14	About 19
Average daily nursing hours per patient	3·6	3·0	7·1	2·9	4·0	4·6	Not available	Not available	Not available	Not available	Not available
Period of observation in hours	87	63	63	63	63	63	48	48	72	72	72
Number of calls by staff	4	Nil	Nil	Nil	2	123	Nil	Nil	Nil	Nil	Nil
Number of calls by patients	258	133	161	74	69	37	25	60	48	41	82
Average number of patients' calls between 7 a.m. and 10 p.m.	51·7	37·0	35·0	19·3	19·7	9·3	*11·0	*25·5	†8·0	†6·3	†8·3
Average number of patients' calls between 10 p.m. and 7 a.m.	17·0	11·0	23·0	8·0	6·0	4·5	§1·5	§4·5	‡8·0	‡7·3	‡19·0
Average number of patients' calls daily	68·7	48·0	58·0	27·3	25·7	13·8	12·5	30·0	16·0	13·6	27·3
Average number of staff calls daily	1·1	Nil	Nil	Nil	0·75	46·8	Nil	Nil	Nil	Nil	Nil
Daily average number of calls per patient revealed by studies	3·7	2·4	3·9	0·9	0·8	0·5	0·7	1·9	0·8	0·7	0·9
Daily average number of calls per patient estimated by nursing staff	3·0	2·0	3·3	1·5	0·7	0·6	0·6	1·9	0·7	0·4	1·0

* 7.30 a.m. to 8.30 p.m. † 8 a.m. to 8 p.m. ‡ 8 p.m. to 8 a.m. § 8.30 p.m. to 7.30 a.m.

Note 1. N/A (non-auditory), A/S (auditory with single reply point) and A/M (auditory with multiple reply points).

Staff calls

44. Only the auditory call system associated with the ward used for Study F was observed to be used extensively and systematically by staff for two-way speech communication with other staff on the ward and with patients. The call system on this ward had better facilities for this type of communication than the other auditory systems studied because it was the only one provided with " nurse presence " indication and wall-mounted speaker/microphones for staff use (see paragraphs 22 and 23). Also it was possible to staff the central control unit in sister's office almost continuously so nurses calling in were nearly always assured of a reply. The nursing staff appeared to appreciate this facility and during the study made more calls than the patients. If existing installations are to be used to the best advantage there is no doubt that more use could and should be made of them for this purpose. It is interesting to note that the American study referred to in paragraph 43 also showed that on the four wards studied a total of 1,431 calls was made by staff in a period of 24 hours.

Result of calls

45. Table 2 provides extracts from the data in appendices A to F to show how calls made by patients and staff during the studies were answered. It also includes an analysis of calls answered by using the two-way speech facility to show the results achieved with this method of communication compared with what would have been achieved if the wards concerned had been fitted instead with properly designed non-auditory systems.

TABLE 2

		APPENDIX					
		A	B	C	D	E	F
	Call system (note 1)	A/S	N/A	N/A	A/M	A/M	A/S
Patient calls	Total number of calls	258	133	161	74	69	37
	Number answered using two-way speech facility	129 (50%)	Not applicable		70 (94·6%)	62 (89·9%)	34 (91·9%)
	Number answered without using two-way speech facility	103 (40%)	133 (100%)	161 (100%)	Nil	7 (10·1%)	3 (8·1%)
	Number not answered because patients cancelled before source traced	26 (10%)	Nil	Nil	4 (5·4%)	Nil	Nil
	Analysis of calls answered using two-way speech facility: (1) Those where walking distance/time was saved	38 (14·7%)	Not applicable		27 (36·5%)	29 (42%)	22 (59·4%)
	(2) Those where walking distance/time was lost	Nil	do.		8 (10·8%)	10 (14·5%)	Nil
	(3) Those where no walking distance/time was saved because type of request did not permit it	68 (26·4%)	do.		27 (36·5%)	21 (30·5%)	7 (19%)
	(4) Those where no walking distance/time was saved because patients either failed to reply or failed to make their requirements known	23 (8·9%)	do.		8 (10·8%)	2 (2·9%)	5 (13·5%)
Staff calls	Total number of calls	4	do.		Nil	2	123
	Number of staff to patient calls	Nil	do.		Nil	Nil	51 (41·5%)
	Number of staff to staff calls	4 (100%)	do.		Nil	2 (100%)	72 (58·5%)
	Number answered using two-way speech facility	4 (100%)	do.		Nil	2 (100%)	116 (94·3%)
	Number not answered because person required was not present	Nil	do.		Nil	Nil	7 (5·7%)
	Analysis of calls answered using two-way speech facility: (1) Those where walking distance/time was saved	4 (100%)	do.		Nil	2 (100%)	114 (92·7%)
	(2) Those where no walking distance/time was saved because calling nurse visited person called	Nil	do.		Nil	Nil	2 (1·6%)

Note 1. N/A (non-auditory), A/S (auditory with single reply point) and A/M (auditory with multiple reply points).

Patients' calls

46. Table 2 shows that all the calls made by patients using the two non-auditory systems studied were successfully answered.

47. In three of the auditory systems studied (D, E and F) a high percentage of patients' calls was answered by using the two-way speech facility. In the case of D and E this was mainly because the systems did not provide over-door and section lights to give a visual indication of the source of calls made from the beds and in the case of F because it was possible to staff the central control unit almost continuously. This was apparently not possible in the ward used for study A and as a result only half the calls made were answered by using the two-way speech facility at the central control unit so that the system was operated as a non-auditory installation to a significant extent.

48. In the wards used for studies A and D patients were able to cancel calls—in both cases the call pushes provided had a second position for this purpose—and the extent to which they did so before their calls were traced is shown in the table. In most cases patients cancelled unintentionally and repeated their calls within a short time so that the total number recorded for these two wards included an element of duplication. Calls cancelled in this way often resulted in some loss of nursing time because an attempt was usually made to trace the caller by going from room to room.

49. The three wards with the highest percentage of calls answered by using the two-way speech facility (D, E and F) also had, as was to be expected, the highest percentages of calls on which walking distance/time was saved. The opportunity to effect savings was limited, however, on all four wards by the number of calls where no more than a visit from a nurse was required and by those where patients either failed to reply or to make their requirements known so that the responding nurse had to visit to inquire the reason for the call. In the case of D and E a few calls produced small losses of walking distance/time for the reason already given in paragraph 35.

Staff calls

50. Only the auditory system on the ward used for study F was used to an appreciable extent for staff intercommunication and staff to patient calls. In a very high percentage of cases the person required was successfully contacted and nearly every successful call saved the caller walking distance/time.

Saving attributable to the use of auditory systems

51. The method used to calculate walking distance/time saved or lost by staff using the two-way speech facility has been described in paragraphs 34, 35 and 36. Table 3 sets out the results obtained by applying these methods to the auditory systems studied and equating the savings achieved with the nursing hours worked.

52. The largest saving of walking distance and, therefore, of time was made in the ward used for study F. This was mainly due to the substantial use made of the two-way speech facility for staff calls although, for obvious reasons, a contributory factor was the large size of the ward itself which has an internal measurement of about 300 feet between its farthest points.

TABLE 3
Savings attributable to the use of auditory systems

	APPENDIX			
	A	D	E	F
Call system (note 1)	A/S	A/M	A/M	A/S
Number of nursing hours worked during study	236¼	222½	369	355¼
Number of patients' calls on which walking distance/time was saved	38	27	29	22
Number of patients' calls on which walking distance/time was lost	Nil	8	10	Nil
Number of staff calls on which walking distance/time was saved	4	Nil	2	114
Total walking distance saved on patients' calls in yards	1210	698	1110	807
Total walking distance lost on patients' calls in yards	Nil	57	77	Nil
Total walking distance saved on staff calls in yards	144	Nil	266	5025
Total net walking distance saved in yards by nurses during study	1354	641	1299	5832
Average walking distance saved in yards per nurse-hour (note 2)	5·7	2·9	3·5	16·4
Average time saved in seconds per nurse-hour—(assuming walking speed of 4 m.p.h.)—(note 2)	2·9	1·5	1·8	8·4

Note 1. A/S (auditory with single reply point) and A/M (auditory with multiple reply points).
Note 2. A nurse-hour is 1 nurse for 60 minutes, 4 nurses for 15 minutes, etc.

53. Another factor which affected the extent to which savings accrued was the practice of nursing the more seriously ill patients in the rooms close to the nursing stations. Such patients—nearly all were confined to bed—made the majority of calls but because the distances between them and nursing staff were small, correspondingly small savings were made. This was the practice adopted on the wards used for studies D and E and is reflected in the small savings achieved.

54. The walking distance/time saved had not previously been measured on any of the wards fitted with auditory systems included in the study and staff were generally under the impression that greater savings were being made than actual measurement has shown to be the case. It seems likely that staff had formed this impression by comparing the present auditory systems with the previous installations or with some other obsolescent installations with which they were familiar and not, as was done in the study, by comparison with what could be achieved with a fully effective non-auditory system.

55. It is apparent that the saving of nursing time achieved by the use of auditory systems on the wards studied may reasonably be regarded as insignificant and further, that only a very substantial and quite unforeseeable increase in usage could increase it to significant proportions.

56. It was thought that the use of an auditory system in an isolation ward might produce additional savings because it might be possible to reduce the time spent on the barrier nursing procedures if a nurse knew a patient's requirements without having to go into a cubicle. It was found on the wards visited which were fitted with non-auditory systems that, in practice, a nurse answering a call would push the cubicle door slightly ajar to inquire the patient's needs and only gowned-up if it was necessary to enter, so that no opportunity was provided for making additional savings.

Time taken to answer patients' calls

57. Table 4 sets out the average times taken by nursing staff to answer patients' calls during the studies and the number of calls on which the averages are based. The non-auditory systems used for studies B and C differed from the others in that the associated buzzers sounded only while a call push was pressed and not for the whole time a call remained unanswered. This resulted in a few calls being missed initially by nursing staff, usually because a patient pressed the push for a brief period and it was not until some time later when the over-door light was seen to be on that such calls were answered. So that the results should not be biased by this obvious system deficiency. The reply times measured for the small number of calls falling into this category were ignored when calculating the average times taken to reply.

58. The average reply times achieved with the two-way speech facility were based on the period between a call being made and the responding nurse commencing to speak into the telephone handset or speaker/microphone. The time taken to reach the bedside was not measured for calls answered in this way because having spoken to the patient the responding nurse did not always go immediately and, in a few cases, did not need to visit at all. In the case of calls traced by lights and buzzers the average reply times were based on the period between a call being made and the responding nurse actually reaching the bedside.

59. In only 7 per cent of calls answered using the two-way speech facility were the nursing staff able to meet the requirements of patients without a visit. The remaining 93 per cent required visiting and for these the average time of 12·9 seconds must be increased by the time for the patient/nurse conversation over the two-way speech system and the time

TABLE 4

	APPENDIX						Overall average
	A	B	C	D	E	F	
Call system (note 1)	A/S	N/A	N/A	A/M	A/M	A/S	
Number of calls answered using two-way speech facility	129	Not applicable		70	62	34	
Number of calls using lights and buzzers	103	133	161	Not applicable		3	
Average time taken to answer calls using two-way speech facility in seconds	12·3	Not applicable		9·2	20·6	8·8	12·9
Average time taken to answer calls traced by lights and buzzers in seconds	19·6	28·1	23·8	Not applicable		5·3	24·0

Note 1. N/A (non-auditory), A/S (auditory with single reply point) and A/M (auditory with multiple reply points).

taken by the nurse to walk to the bedside to determine the reply time for an auditory system comparable with the average of 24·0 seconds achieved with the non-auditory systems. This can be expected to produce an aggregate time at least as great as that achieved with the latter and the only gain to the patient is the earlier indication that the call will be answered.

60. This is the only significant respect in which auditory systems were shown by the studies made to be superior to non-auditory systems. Those medical and nursing officers connected with the wards studied who were asked to comment on the relative importance of this earlier indication of attention were generally agreed that it was not significant enough by itself to justify the provision of auditory systems, even in wards of single-bed rooms where maximum use of call facilities can be expected.

Purpose of calls made

By patients

61. The reasons for calls made by patients during the studies were observed to fall mainly into seven categories, although a few requests for services and information fell outside and these, for convenience, were classified as " miscellaneous ". The categories identified during the studies and the percentages of calls appropriate to each are set out in Table 5 which also shows the extent, expressed as a percentage of total calls made, to which patients were apparently unwilling to disclose the reason for calls made over the two-way speech system and, instead, asked to see a nurse. The reasons for these calls were learned subsequently from the responding nurses and they are included also under the other eight classifications shown.

62. Most of the calls made fell into one of the first four categories in Table 5. These were calls that normally required a specific article to be taken to the patient and when answered with the aid of the two-way speech facility generally enabled the nurses concerned to save walking distance/time by taking anything required when they first visited. There were some exceptions to this because calls in the first category also included requests for the removal of bedpans, urinals and colostomy trays as well as assistance on and off commodes, and on these there was no opportunity for savings because they were requests for services only. This applied also to calls falling into the last four classifications which were also mostly requests for services only, although savings were possible in a number of cases where patients used the two-way speech facility to ask for information (classified under " miscellaneous ") and it was given by the responding nurses without recourse to visiting. The unwillingness of some patients to disclose the purpose of their calls when using the two-way speech facility also reduced the opportunity for nursing staff to save walking distance/time and, in fact, of the 295 calls answered with the aid of this facility during the studies only 116 (39·3%) produced savings. This is very close to the comparable figures of 42·6% (day) and 38·0% (night) produced by the American study referred to in para. 43. Table 6 shows the distribution of these 116 calls among the five classifications on which savings were achieved.

TABLE 5

	APPENDIX					
	A	B	C	D	E	F
Number of calls (Note 1)	232	133	161	70	57	37
Purpose of calls made Bedpan, urinal, commode, colostomy tray	46·1%	69·2%	38·1%	68·6%	67·3%	10·8%
Drug, dressing (mainly sedatives, analgesics and sanitary towels)	10·7%	3·8%	15·3%	4·3%	8·6%	21·6%
Diet	6·3%	6·0%	15·9%	4·3%	1·7%	—
Drinking water	5·8%	1·5%	1·2%	2·8%	3·5%	5·4%
Attention to bed	·5%	12·0%	12·2%	1·4%	1·7%	—
Requiring reassurance	8·2%	3·8%	6·3%	1·4%	1·7%	2·7%
Complained of feeling unwell	2·4%	—	1·2%	2·8%	8·6%	13·5%
Miscellaneous (Note 2)	20·0%	3·7%	9·8%	14·4%	6·9%	46·0%
Asked for nurse	9·9%	Not applicable		11·4%	3·5%	13·5%

Note 1. Calls made in error or cancelled before sources traced are not included.

Note 2. Included requests for help with meal, closing and opening of doors and windows, drawing curtains, hot water bottles, removal of flowers, information about visiting hours and discharge, etc.

TABLE 6

Purpose of calls made	Number of calls on which savings were made
Bedpan, urinal, commode, colostomy tray	74 (63·8%)
Drug, dressing	15 (12·9%)
Diet	3 (2·6%)
Drinking water	4 (3·5%)
Miscellaneous	20 (17·2%)

63. It has already been shown in this report that the savings of walking distance/time which accrued during the study from patients' calls were very small indeed and this further analysis of the calls on which the savings were actually made shows that nearly two-thirds were concerned with the provision of bedpans, urinals, commodes and colostomy trays to patients. Where the facilities to meet this type of call are provided in the patients' rooms or in close proximity to them, the opportunity to make even the small savings made at present with auditory systems largely disappears. Such an arrangement also produces a saving of nursing time on wards fitted with non-auditory systems.

By staff

64. Only on the ward used for study F was the call system used to any extent by the staff for two-way speech communication with colleagues and patients. The purpose of the calls made by the staff on this ward is set out in Appendix F.

IV. Field studies—summary of conclusions

65. The main conclusions arising from the studies made are summarised below:

	Paragraph
(1) Non-auditory call systems meet the needs on open wards.	31
(2) Patients in single rooms normally make most calls and the number usually decreases as the size of the bed groupings increases. The number of calls made is also influenced by the proportion of ambulant patients, the provision of sanitary rounds after meals, the presence of private patients and the sex of the patients.	38 to 43
(3) Only one of the auditory systems studied was being used by staff for intercommunication purposes to any extent and if the existing installations of this type of equipment are to be used to the best advantage as much use should be made of them for this purpose as possible.	44 and 50
(4) Call reset pushes should not be sited in a position likely to result in patients cancelling unintentionally.	48
(5) The savings of walking distance/time achieved by nurses with the use of the four auditory systems studied were negligible and only a very substantial and entirely unforeseeable increase in the use of call systems could produce significant savings.	49 51 to 55 62 and 63
(6) An auditory system provides no additional savings in an isolation ward where the nursing practice described in the report obtains.	56
(7) Calls can be missed by nursing staff when the call system buzzer(s) sounds only while the call push is pressed.	57
(8) Auditory systems provide patients with an earlier indication that a call will be answered than do non-auditory systems, but do not enable the responding nurse to reach the bedside any sooner. This was the only significant advantage revealed for auditory systems by the studies and it is not considered sufficient to justify the additional cost of providing them.	58 to 60

V. Requirements of a patient/nurse call system

66. The principal requirements identified during the study can be summarised as follows:

For patients

67. (1) Call buttons should be readily accessible and require a minimum of physical effort to operate.
(2) The system should include call facilities in all parts of a ward used by patients and should provide the means for a prompt reply to be given.
(3) Patients should be given an indication that calls have been successfully made.
(4) There should be a minimum of disturbance from lights and buzzers, particularly at night.

For nursing staff

68. (1) The system should provide an immediate indication of calls made—visual or audible—in all

parts of a ward unit where nursing staff may be present. To guard against calls being missed it is desirable for an audible indication to be given for the whole period a call remains unanswered.

(2) Responding staff should be provided with an unambiguous identification of the source of calls made.

(3) Provision should be made for a nurse attending to a patient and requiring the help of another nurse but unable to leave because of the patient's condition, to summon the required assistance and, if the staff on the ward is reduced to one, provide for the transfer of such a call to another staffed location as close to the first as possible.

(4) Facilities for cancelling patients' and emergency calls should be provided which should not be sited in a position likely to result in patients cancelling unintentionally.

VI. Meeting the requirements

69. None of the systems in use or available appeared entirely to meet the need. A system, basically non-auditory, which would seem most likely to satisfy the requirements identified during the study, is therefore specified. In this part of the report there is repetition of some of the information appearing in Section II describing the equipment and systems available. This has been included for ease of reference.

70. A non-auditory system should enable patients to originate calls from the bedhead (including beds in admission units, and in first stage and delivery rooms in maternity units), in day rooms, treatment rooms, bathrooms and w.c.'s. Each such location should be provided with a wall unit fitted, *inter alia*, with a call button and reassurance light and in each bedhead wall unit should be installed a socket to accommodate a pear-push or similar switch for use in place of the call button where the condition of the patient requires it. Ceiling or wall switches may be provided in bathrooms and w.c.'s in place of call buttons, but when installed in the latter their purpose should be clearly indicated to avoid calls being made unintentionally by patients mistaking the cords operating the switches for the pulls operating the flushing mechanism. This was observed to occur on six occasions during one of the studies made.

71. A reassurance light does not, of course, indicate that a call is being or will be answered but only that the equipment is switched on and, barring a number of separate faults in other parts of the system, the associated call indicator devices are working. It might, therefore, appear desirable to provide facilities enabling the responding nurse to signal to the patient that the call will be answered but, for the following reasons, may not be considered practicable:

(1) To do so would require the addition of several signalling devices to an already complex system to provide adequate coverage and, because more than one call might be made at the same time, these devices would need to be capable of discrimination.

(2) For each call the responding nurse would have to decide, based on her position in the ward at the time and the distances involved, whether it was preferable to go straight to the patient rather than by way of the nearest signalling device.

72. Consideration of other facilities frequently incorporated in bedhead wall units was outside the scope of the study. However it may be thought necessary in some cases to provide for patients who are incapable of the movement necessary to operate the controls on a bedhead wall unit, but who could manage and would appreciate the provision of a hand unit incorporating, for example, a selector switch and volume control for radio and television sound and a switch for the over-bed light. This can be done by including a multi-channel outlet in the wall unit to provide the connections for the hand unit which should include the patient's call button to obviate the need to issue a separate pear-push.

Day use

73. A call originated from any source would cause the associated reassurance and over-door lights to come on and buzzers audible at all points in the ward unit to sound until the call was answered. In all but the smallest wards the practice of providing only one buzzer at a central point generally necessitates a sound level which is disturbing to patients in the immediate vicinity and it is usually desirable to install a number of buzzers of lower volume at suitable intervals in the ward unit to provide the coverage required.

74. A nurse responding to a call would trace its source by the over-door light and, where the room or sanitary annexe had more than one calling point, by the reassurance light. To facilitate the tracing of calls in the larger types of open ward it would generally be preferable to install reassurance lights of a bigger size than those normally provided in bedhead wall units and locate them on the walls above and behind the beds, although their optimum siting would depend on ward layout and any partitioning and/or curtaining installed. It is important that these lights should not be obscured when bed curtains are drawn. In sanitary annexes it may be necessary to provide additional call lights over the doors of the individual cubicles if it is not possible to install the reassurance lights in positions that are readily visible to the calling patients and the responding nurses.

75. In wards with more complex layouts all over-door lights will not be visible from all points in the

corridors and further lights (section lights) should be installed at appropriate points to indicate the part of the ward from which a call was made. The section lights should be sited to provide nurses with an unambiguous indication of the direction in which to proceed to the calling patient, irrespective of their position on the ward unit at the time the call is made.

Night use

76. It is generally desirable that buzzers should be switched off at night to prevent unnecessary disturbance to patients. Calls should then be indicated by the combination of lights used during the day and either (*a*) bringing into use a further series of lights in those parts of the ward which are covered by buzzers during the day or (*b*) connecting the call system to an induction loop staff location system and providing each ward with a paging receiver tuned to receive and relay as an audible signal calls originating only in the ward for which it is provided. The latter arrangement is preferable to the use of additional lights, some of which would need to be installed in the patients' rooms to ensure full coverage and might cause disturbance. A hospital already equipped with a staff location system could have this facility provided for about £40 per ward. For hospitals not already equipped or for new hospitals the installed cost of a system covering 10 wards and providing one paging receiver for each would be about £600.

77. To enable a nurse to summon the assistance of a colleague if an emergency arose which prevented the nurse leaving the patient concerned, a separate call button should be provided at each location referred to in paragraph 70. Emergency call buttons should be distinctively marked and, as a further safeguard against accidental use, could be made to operate by pulling rather than pushing.

78. An emergency call made during the day would cause the over-door and section lights to flash, and the buzzers to sound in a manner readily distinguishable from the normal call tone. At night if the buzzers are switched off, emergency calls would be signalled either by (*a*) causing all the lights used to signal night calls to flash or (*b*) if a staff location system was in use, by causing only over-door and section lights to flash, and providing a second paging receiver on each ward so that two nurses on duty would be capable of receiving an audible indication of normal calls from patients and emergency calls originated by each other or any other nurse on duty. It would, of course, be necessary to provide for the signals produced by the paging receivers when indicating emergency and patients' calls to be readily distinguishable. It can also be arranged for a night sister to be supplied with a paging receiver capable of picking up emergency calls originating on the wards for which she is responsible, and emitting a different call tone for each to provide identification of their source.

Special requirements of particular types of accommodation

79. In the nurseries of maternity units and on wards where patients are under continuous observation as, for example, in an intensive care unit, patients' call facilities are not normally required and provision should only be made for staff to make emergency calls. This could also apply to ward treatment rooms where the practice is not to leave patients unattended.

80. It is understood from medical and nursing staff connected with geriatric wards that in some cases the confused mental state of such patients could lead to an irresponsible use of call facilities. It may therefore be desirable to include facilities enabling individual call pushes on such wards to be switched out of circuit or provided in a form that would enable them to be removed.

81. Although a patient undergoing treatment in a radiotherapy department is invariably observed continuously by the radiographer responsible, direct oral communication may not be possible because of the intervening protective shielding. In such circumstances it may be desirable to provide a speech link between them by installing electronic intercommunication equipment.

Effect of nursing practice on call system requirements

82. An additional problem in call system design can arise if the area of nursing responsibility of a ward's staff is variable as, for example, where there is an overlap in the use of peripheral beds between adjoining wards, or the staffing of a special care unit is shared between adjoining wards, or beds are grouped differently for nursing at night. A suggested solution for this type of problem would be to provide additional switching so that the coverage of the call systems and the areas of responsibility of the individual nursing teams concerned could always be made to coincide.

Call transfer

83. If a ward is likely to be staffed by only one nurse at any time of night or day—a position that could occur at night during meal breaks—switching should be provided to transfer emergency calls to other nursing staff on duty as near to the first ward as possible. The nurses to whom responsibility for answering such calls is transferred should be provided with a clear indication of their source and, where a staff location system is in use for signalling night calls, one receiver would be deposited with the nurses to whom calls are to be transferred.

Cancelling calls

84. To enable nursing staff to cancel patients' calls and at the same time to ensure that all patients initiating calls are visited, all calling points should have associated reset pushes. These should be sited in view of the calling patients, if possible, or at least close to the calling points and, to prevent patients

cancelling unintentionally, should not be incorporated in a dual purpose switch with the normal call push. In practice it may be found convenient to cancel all the call points in small wards and sanitary annexes with a single reset push sited near the door and in larger wards by installing pushes at intervals with each covering a group of the beds. Similar but separate facilities should be provided to cancel emergency calls originated by nursing staff.

Nurse presence indication

85. Further over-door lights—often a segment of a dome light is used which also incorporates the patients call and emergency call lights—can be installed to indicate the whereabouts of nursing staff on the ward. A nurse entering a room on the ward presses the "presence" push by the door which causes the appropriate over-door light to come on; a separate push is provided for the nurse to cancel when she leaves. Separate but similar facilities can be provided to indicate the whereabouts of the ward sister.

86. In a non-auditory system the use of this facility could assist where the size of the ward and/or the complexity of the layout made location of nursing staff difficult, although the operation of such a system does impose a small additional burden on nursing staff and, to be successful, requires they should be punctilious in their use of the " presence " pushes. Nursing advisers concerned with planning have emphasised the importance of this facility in relation to present-day ward layouts where the beds are located in small groups or single rooms.

Central call indicators

87. Call indicator panels with a separate light for each calling point used by patients are sometimes installed at the duty station and/or in the ward sister's office. These provide immediate identification of the source of calls which could be significant if there were any seriously ill or disturbed patients in a ward whose calls might need to be treated as urgent, and also indicate by the time the lights stay on the time taken to reply. Additional lights may be provided on indicator panels to work in conjunction with a " nurse presence " system so that the whereabouts of nursing staff on the ward may also be known centrally.

88. The inclusion of central call indicators in a call system would depend on the significance attached to the advantages provided taking into account the particular ward layout and the type of patient involved.

VII. Specification and siting of a call system

89. Appendices L and M illustrate how the features of the non-auditory type of call system recommended in this report might be sited in practice in the linear ward referred to in Appendix C and in a ward planned in depth respectively. The latter has been copied from the Ward Planning Handbook compiled by the South-West Metropolitan Regional Hospital Board and has been chosen because it enables the siting of the principal call system features referred to in this report to be shown. The following call system features are provided in the two layouts chosen:

(1) At each bedhead is a patients' call push, reassurance light, and combined emergency call push and reset push.

(2) The same features are provided within patients' reach in each w.c., bathroom and washing cubicle and, in the case of Appendix M, in the day space.

(3) Each treatment room is provided only with a combined emergency call and reset push because it has been assumed that the practice is never to leave patients undergoing treatment unattended.

(4) All the rooms used by patients have an overdoor light in the corridor and, apart from the treatment rooms, a call reset push on the wall near the door. The treatment room in Appendix M has an over-door light for each of the two doors giving access to the main corridors. The three patients' call pushes in each of the two lavatory groups in Appendix L have only one reset push and one over-door light associated with each group. In Appendix M where washing and w.c. facilities are provided en suite with the bed units, the patients' call pushes in the individual cubicles are linked with the over-door light and reset push of the associated bed unit. In both cases the individual cubicles could, if required, be provided as well with separate over-door lights.

(5) Two buzzers are included in each layout to provide an audible but distinguishable indication of patients' and emergency calls. The use of two buzzers should make it possible for full coverage of the ward unit to be provided at comparatively low volume.

(6) Because in Appendix M all the over-door lights cannot be seen from all positions or, in fact, any position in the ward corridors, two groups of section lights are provided. A responding nurse, if she cannot see the over-door light of the calling patient, will know the part of the ward in which the call originated by referring to the section lights and will therefore know the direction in which to proceed to answer it. To provide this facility in the layout chosen it was necessary to sub-divide the ward into the four sections shown hatched on the smaller plan in the Appendix. Other layouts may require a fewer or larger number of sub-

divisions although, for obvious reasons, section lights should not normally be necessary in call systems for lineally planned wards.

(7) If the buzzers are switched off at night and the call system is not linked with a staff location system for audible call indication, additional night call indicator lights would be required where shown.

(8) A call indicator panel is provided at the nurses' station in Appendix M.

Appendix A

(paragraph 32)

Data produced by detailed study of an auditory call system

1. ***Accommodation***

The ward provided 20 beds for all categories of male and female medical and surgical case (Section V only) in 18 single-bed and 1 two-bed rooms.

2. ***Main features of call system***

An auditory system with a single reply point for staff was installed with each bed provided with a wall-mounted speaker/microphone, call push and reassurance light. Calls were also indicated by over-door lights and a buzzer. Non-auditory call facilities only were provided in bathrooms and w.c.'s.

3. ***Layout of ward***

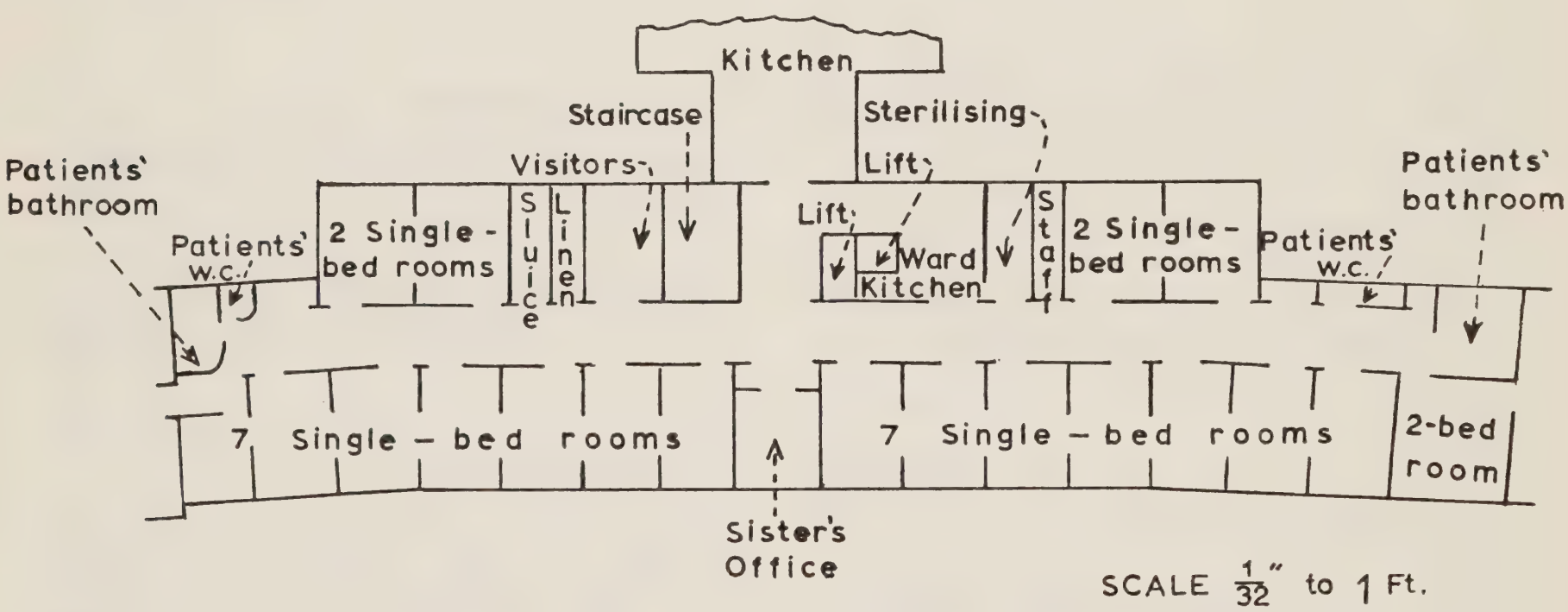


Figure 1.

4. ***Period of observation***

7 a.m. on 14th January, 1964, to 10 p.m. on 17th January, 1964.

5. ***Details of staff and patients***

Average bed occupancy	18·5
Average number of ambulant patients ..	7·0
Average number of nurses on duty 7 a.m. to 10 p.m.	3·2*
Average number of nurses on duty 10 p.m. to 7 a.m.	2·0*
Average daily number of nursing hours per patient	3·6*

* Includes meal breaks

6. ***Number of calls made by patients***

Total number of calls	258
Calls answered by nurse using 2-way speech facility	129
Calls answered by nurse identifying source by over-door lights in the corridor ..	103
Calls not answered because patients cancelled before nurse identified source ..	26
Calls answered on which walking distance/time was saved	38
Calls answered on which no walking distance/time was saved	68
Calls on which the patients either failed to reply or failed to make their requirements known	23
Average number of calls between 7 a.m. and 10 p.m.	51·7
Average number of calls between 10 p.m. and 7 a.m.	17·0
Daily average number of calls	68·7
Average number of calls per hour between 7 a.m. and 10 p.m.	3·4
Average number of calls per hour between 10 p.m. and 7 a.m.	1·9
Average number of calls per hour	2·9
Daily average number of calls per patient	3·7

7. ***Time taken to answer calls made by patients***

Average time for all calls	15·2 secs.
Average time for all calls answered by using 2-way speech facility	12·3 secs.

Average time for all calls answered without the use of 2-way speech facility .. 19·6 secs.

8. ***Walking distance/time saved by patients' use of auditory system***

Total walking distance saved by nursing staff during period of observation .. 1,210 yds.
Average walking distance saved daily 334 yds.
Average walking distance saved by a nurse during each hour of duty .. .. .. 5 yds.
Average time saved by a nurse during each hour of duty (assuming walking speed of 4 m.p.h.) .. .. 2·7 secs.

9. ***Purpose of calls made by patients***

Bedpan, urinal, commode .. .. .. 46·1%
Drug, dressing .. .. 10·7%
Diet .. .. 6·3%
Attention to bed .. .. 5·8%
Drinking water .. .. ·5%
Requiring reassurance .. .. .. 8·2%
Complained of feeling unwell .. .. 2·4%
Miscellaneous .. .. 20·0%

[" Miscellaneous " included requests for help with meal, shutting or opening of doors or windows, drawing curtains, hot water bottles, etc.]

10. ***Call made by staff***

Four calls were made by staff during the study, either by a doctor or the ward sister, asking for the assistance of a nurse on duty. All were answered from the central control unit with the aid of the two-way speech facility and produced a saving of walking distance totalling 144 yards.

Appendix B

(paragraph 32)

Data produced by detailed study of a non-auditory call system

1. ***Accommodation***

The ward provided 22 beds for all categories of male and female medical and surgical case (1 Section V, 3 Section IV and the remainder not fee-paying) divided into 18 single-bed and 2 two-bed rooms.

2. ***Main features of call system***

A non-auditory system was installed with a call push provided for each bed, patients' bathroom and w.c. Calls were indicated by over-door lights and buzzers.

3. ***Layout of ward***

Average number of nurses on duty 7 a.m. to 10 p.m. .. .. 2·8*
Average number of nurses on duty 10 p.m. to 7 a.m. .. .. 2·0*
Average daily number of nursing hours per patient .. .. 3·0*

* Includes meal breaks.

6. ***Number of calls made*** (all by patients)

Total number of calls 133
Average number of calls between 7 a.m. and 10 p.m. 37
Average number of calls between 10 p.m. and 7 a.m. 11

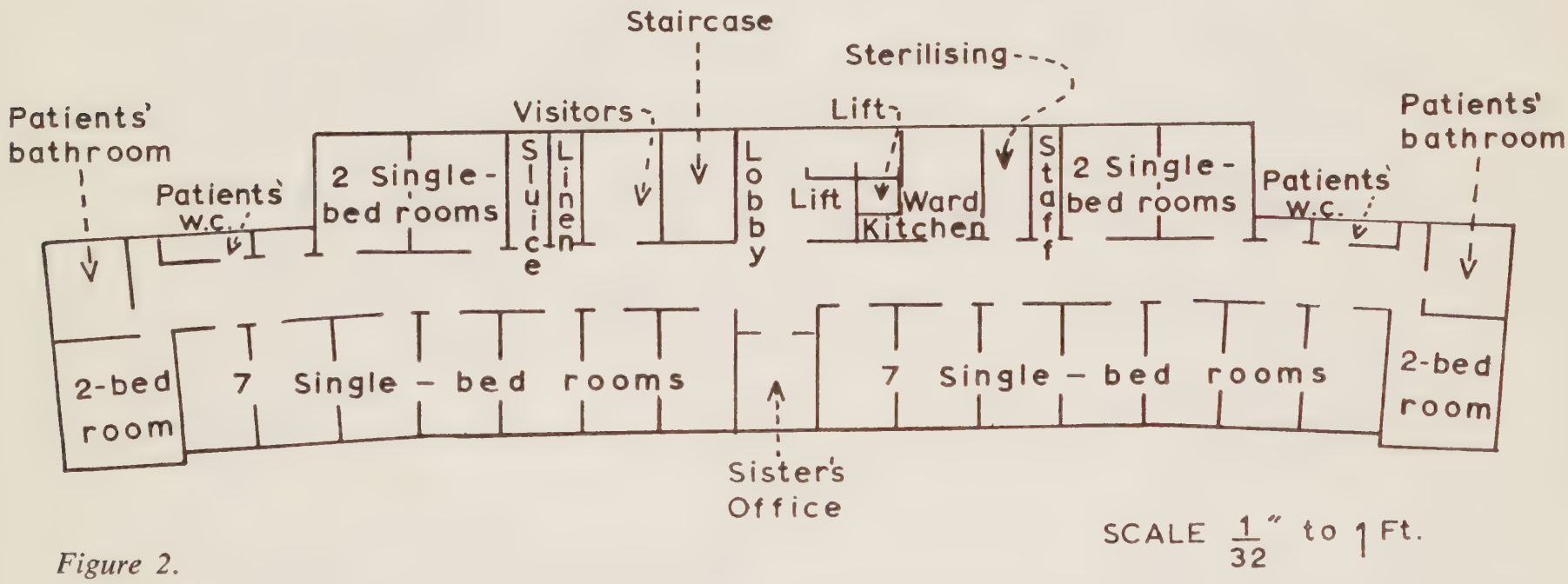


Figure 2.

4. ***Period of observation***

7 a.m. on 14th January, 1964, to 10 p.m. on 16th January, 1964.

5. ***Details of staff and patients***

Average bed occupancy .. .. .. 20·0
Average number of ambulant patients .. 8·5

Daily average number of calls 48
Average number of calls per hour between 7 a.m. and 10 p.m. .. .. .. 2·47
Average number of calls per hour between 10 p.m. and 7 a.m. .. .. .. 1·22
Average number of calls per hour .. .. 2·0
Daily average number of calls per hour .. 2·4

7. ***Time taken to answer calls***

Average time	28·14 secs.

8. ***Purpose of calls made by patients***

Bedpan, urinal, commode	69·25%
Drug, dressing	3·75%
Diet	6·0%
Attention to bed	12·0%
Drinking water	1·5%
Requiring reassurance	3·75%
Complained of feeling unwell	—
Miscellaneous	3·75%

[" Miscellaneous " included requests for the removal of flowers, information about discharge, opening of window, etc.]

Appendix C

(paragraph 32)

Data produced by detailed study of a non-auditory call system

1. ***Accommodation***

The ward provided 16 beds for all categories of male and female medical and surgical care (Section V only) in single rooms.

2. ***Main features of call system***

A non-auditory system was installed with a call push provided for each bed, patients' bathroom and w.c. Calls were indicated by over-door lights and a buzzer, and a call indicator panel was provided in the corridor outside sister's office.

3. ***Layout of ward***

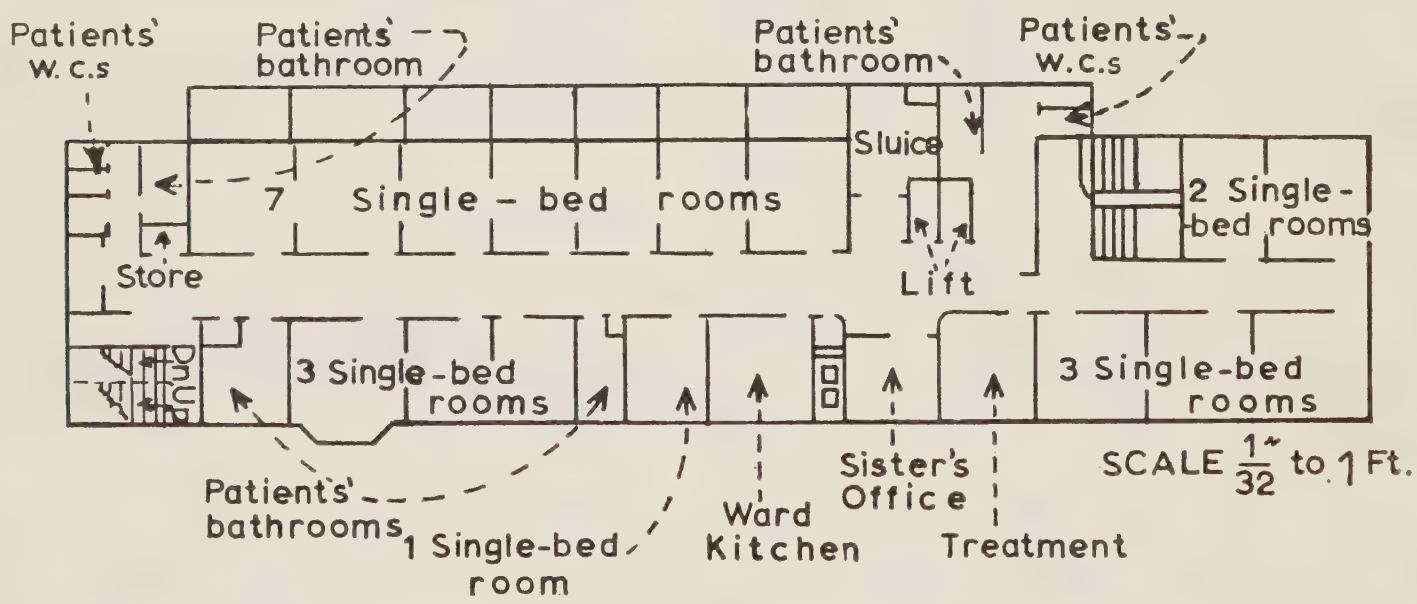


Figure 3.

4. ***Period of observation***

7 a.m. on 11th February, 1964, to 10 p.m. on 13th February, 1964.

5. ***Details of staff and patients***

Average bed occupancy	15·3
Average number of ambulant patients ..	7·0
Average number of nurses on duty 7 a.m. to 10 p.m.	5·3*
Average number of nurses on duty 10 p.m. to 7 a.m.	2·5*
Average daily number of nursing hours per patient	7·1*

* Includes meal breaks.

6. ***Number of calls made*** (all by patients)

Total number of calls	161
Average number of calls between 7 a.m. and 10 p.m.	35
Average number of calls between 10 p.m. and 7 a.m.	23
Daily average number of calls	58
Daily average number of calls per patient	3·8
Average number of calls per hour between 7 a.m. and 10 p.m.	2·3
Average number of calls per hour between 10 p.m. and 7 a.m.	2·5
Average number of calls per hour	2·4
Daily average number of calls per patient ..	3·9

7. ***Time taken to answer calls***

Average time	23·8 secs.

8. ***Purpose of calls made by patients***

Bedpan, urinal, commode	38·1%
Drug, dressing	15·3%
Diet	15·9%
Attention to bed	12·2%
Drinking water	1·2%
Requiring reassurance	6·3%
Complained of feeling unwell	1·2%
Miscellaneous	9·8%

[" Miscellaneous " included requests for assistance with washing and bathing, closing window, switching off light, waste paper basket, information about visiting hours, etc.]

Appendix D

(paragraph 32)

Data produced by detailed study of an auditory call system

1. ***Accommodation***

The ward provided 30 female medical beds (no private patient accommodation) for pulmonary T.B. and other diseases of the chest in 6 two-bed and 18 single-bed rooms.

2. ***Main features of call system***

An auditory system with multiple reply points for staff was installed with each bed provided with a pillowphone which served as a speaker/microphone for the call system and incorporated a call switch and call reset switch. Calls were indicated by lights at each reply point and buzzers. No call facilities were provided in patients' bathrooms and w.c.'s.

3. ***Layout of ward***

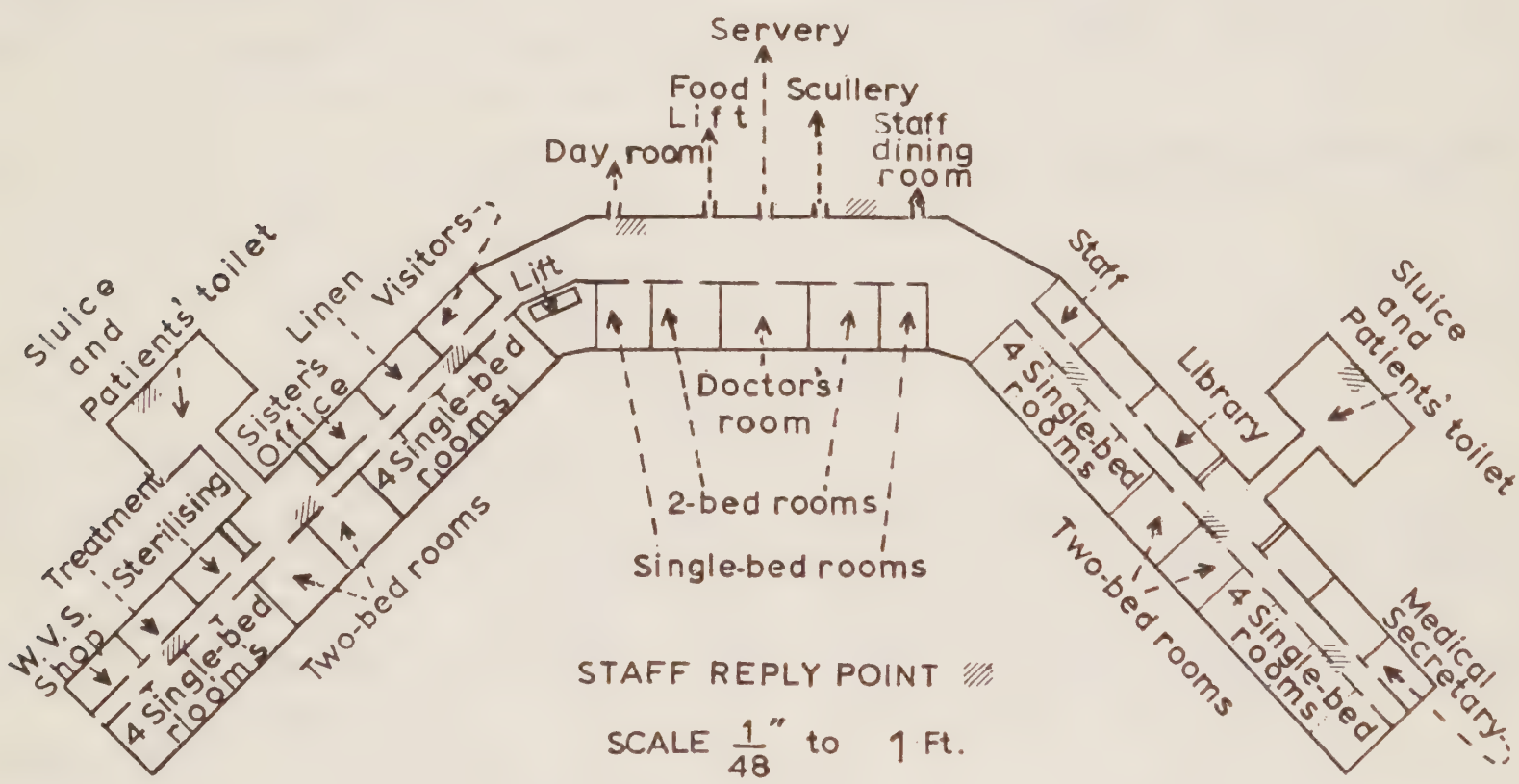


Figure 4.

4. ***Period of observation***

7 a.m. on 8th April, 1964, to 10 p.m. on 10th April, 1964.

5. ***Details of staff and patients***

Average bed occupancy	28·6
Average number of ambulant patients	20·2
Average number of nurses on duty 7 a.m. to 10 p.m.	4·1*
Average number of nurses on duty 10 p.m. to 7 a.m.	2·0*
Average daily number of nursing hours per patient	2·9*

* Includes meal breaks.

6. ***Number of calls made*** (all by patients)

Total number of calls	74
Calls answered by nurse using 2-way speech facility	70
Calls not answered because patients cancelled before nurses identified source	4
Calls answered on which walking distance/time was saved	27
Calls answered on which walking distance/time was lost	8
Calls answered on which no walking distance/time was saved	27
Calls on which the patients either failed to reply or failed to make their requirements known	8
Average number of calls between 7 a.m. and 10 p.m.	19·3

Average number of calls between 10 p.m. and 7 a.m.	8·0
Daily average number of calls	27·3
Average number of calls per hour between 7 a.m. and 10 p.m.	1·3
Average number of calls per hour between 10 p.m. and 7 a.m.	·9
Average number of calls per hour	1·2
Daily average number of calls per patient	·9

7. ***Time taken to answer calls***

Average time for all calls	9·2 secs.

8. ***Purpose of calls made by patients***

Bedpan, colostomy tray	68·6%
Drug, dressing	4·3%
Diet	4·3%
Attention to bed	1·4%
Drinking water	2·8%
Requiring reassurance	1·4%
Complained of feeling unwell	2·8%
Miscellaneous	14·4%

[" Miscellaneous " included requests for removal of washing bowl, drawing curtains, refilling hot water bottles, removal of flowers, etc.]

9. ***Walking distance/time saved by patients' use of auditory system***

Total walking distance saved by nursing staff during period of observation	698 yds.
Total walking distance lost by nursing staff during period of observation	57 yds.
Net walking distance saved by nursing staff during period of observation	641 yds.
Average net walking distance saved daily	245 yds.
Average walking distance saved by a nurse during each hour of duty	2·9 yds.
Average time saved by a nurse during each hour of duty (assuming walking speed of 4 m.p.h.)	1·5 secs.

Appendix E

(paragraph 32)

Data produced by detailed study of an auditory call system

1. ***Accommodation***

The ward provided 49 gynaecological beds (no private patient accommodation) in 7 single, 17 two-bed and 2 four-bed rooms.

2. ***Main features of call system***

An auditory system with multiple reply points for staff was installed with a hand unit for each bed incorporating, *inter alia*, a speaker/microphone, call push and reassurance light. Calls were indicated by call indicator panels at each reply point and buzzers. Non-auditory call facilities only were provided in bathrooms and w.c.'s. The emergency call facility was included in the system.

3. ***Layout of ward***

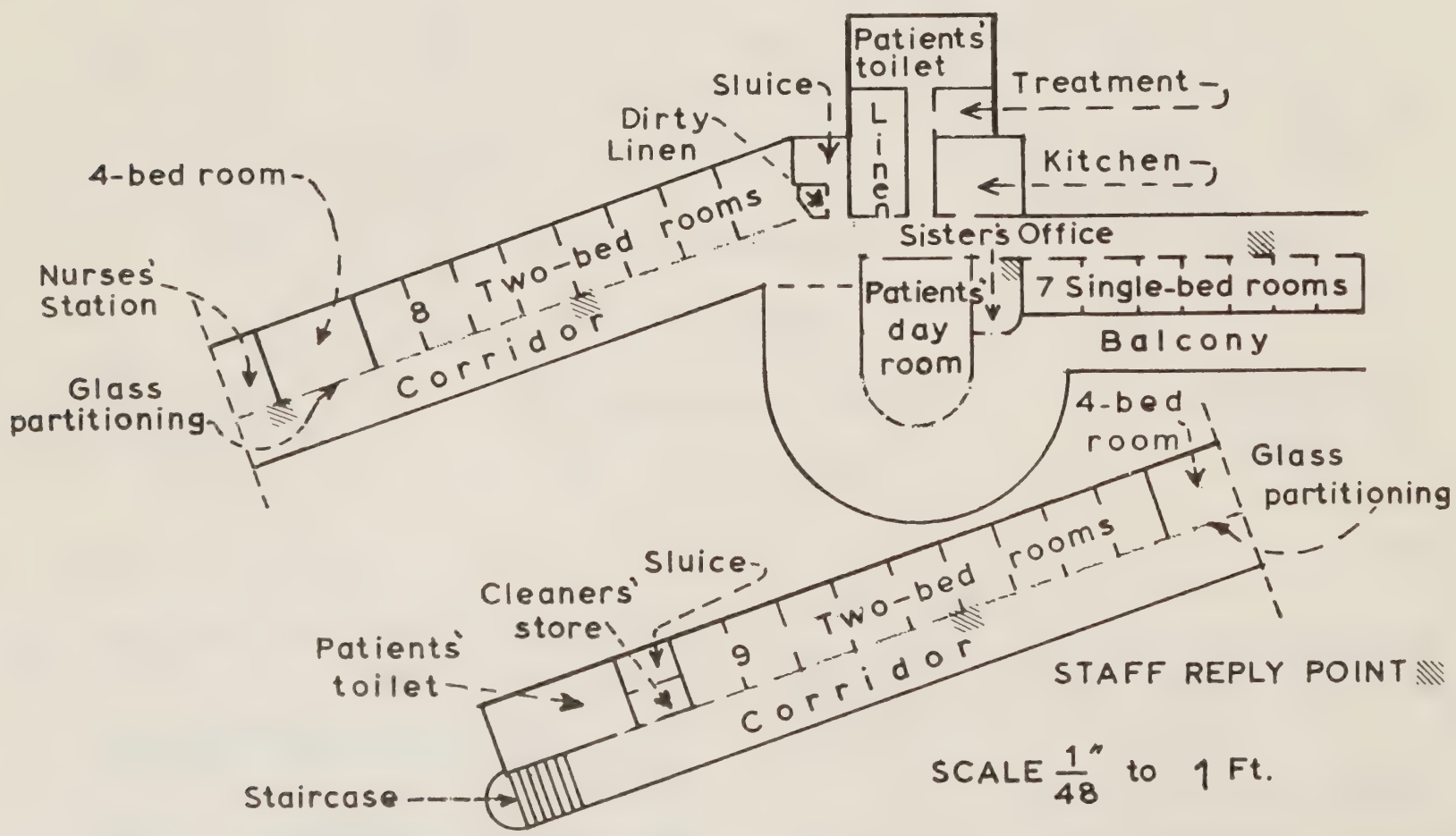


Figure 5.

4. ***Period of observation***

7 a.m. on 14th April, 1964, to 10 p.m. on 16th April, 1964.

5. ***Details of staff and patients***

Average bed occupancy	33·2
Average number of ambulant patients ..	20·1
Average number of nurses on duty 7 a.m. to 10 p.m.	7·0*
Average number of nurses on duty 10 p.m. to 7 a.m.	3·0*
Average daily number of nursing hours per patient	4·0*

* Includes meal breaks.

6. ***Number of calls made by patients***

Total number of calls	69
Calls answered by nurse using 2-way speech facility (including 6 calls made in error from beds)	62
Calls answered by nurse without using 2-way speech facility (nurse saw patient making call)	1
Calls made in error by patients from sanitary annexes (patients mistakenly thought the cords of the ceiling switches operating the non-auditory call facility in the w.c.'s operated the flushing mechanism; in all cases but one the patients vacated the w.c.'s before the responding nurses arrived)	6
Calls answered on which walking distance/time was saved	29
Calls answered on which walking distance/time was lost (including 6 calls made in error from beds)	10
Calls answered on which no walking distance/time was saved	21
Calls on which the patients either failed to reply or failed to make their requirements known	2
Average number of calls between 7 a.m. and 10 p.m.	19·7
Average number of calls between 10 p.m. and 7 a.m.	6·0
Daily average number of calls	25·7
Average number of calls per hour between 7 a.m. and 10 p.m.	1·3
Average number of calls per hour between 10 p.m. and 7 a.m.	·7
Average number of calls per hour	1·1
Daily average number of calls per patient ..	·8

7. ***Time taken to answer calls***

Average time for all calls	20·4 secs.
Average time for all calls answered by using 2-way speech facility	20·6 secs.
Time for single call answered without using 2-way speech facility	5·0 secs.

8. ***Purpose of calls made by patients***

Bedpan	67·3%
Drug, dressing	8·6%
Diet	1·7%
Attention to bed	1·7%
Drinking water	3·5%
Requiring reassurance	1·7%
Complained of feeling unwell	8·6%
Miscellaneous	6·9%

[" Miscellaneous " included requests for mug and for letter to be posted, telling nurse specimen was ready, etc.]

9. ***Walking distance/time saved by patients' use of auditory system***

Total walking distance saved by nursing staff during period of observation ..	1,110 yds.
Total walking distance lost by nursing staff during period of observation	77 yds.
Net walking distance saved by nursing staff during period of observation ..	1,033 yds.
Average walking distance saved daily ..	393 yds.
Average walking distance saved by a nurse during each hour of duty	2·8 yds.
Average time saved by a nurse during each hour of duty (assuming walking speed of 4 m.p.h.)	1·4 secs.

[No account has been taken in this section of the walking distance/time lost through the 12 calls made in error. The figures shown are based on the calls made intentionally by patients.]

10. ***Calls made by staff***

Two calls were made by staff during the study, both by a ward sister asking for the assistance of another nurse on duty. Both were answered from the reply point in the sister's office and produced a saving of walking distance totalling 266 yards.

Appendix F

(paragraph 32)

Data produced by detailed study of an auditory call system

1. ***Accommodation***

The ward provided 41 gynaecological beds (no private patient accommodation) in 9 single, 3 two-bed, 1 three-bed, 1 four-bed, 1 six-bed and 1 thirteen-bed rooms.

2. ***Main features of call system***

An auditory system with a single reply point for staff

was installed with each bed provided, *inter alia*, with a speaker/microphone, call push and reassurance light mounted in a unit on a swivel-arm. Calls were indicated by over-door lights and buzzers. Additional wall-mounted speaker/microphones were provided for paging purposes and for use in connection with the "nurse presence" facility which was also installed. Non-auditory facilities only were provided in bathrooms and w.c.'s. The emergency call facility was included in the system.

3. ***Layout of ward***

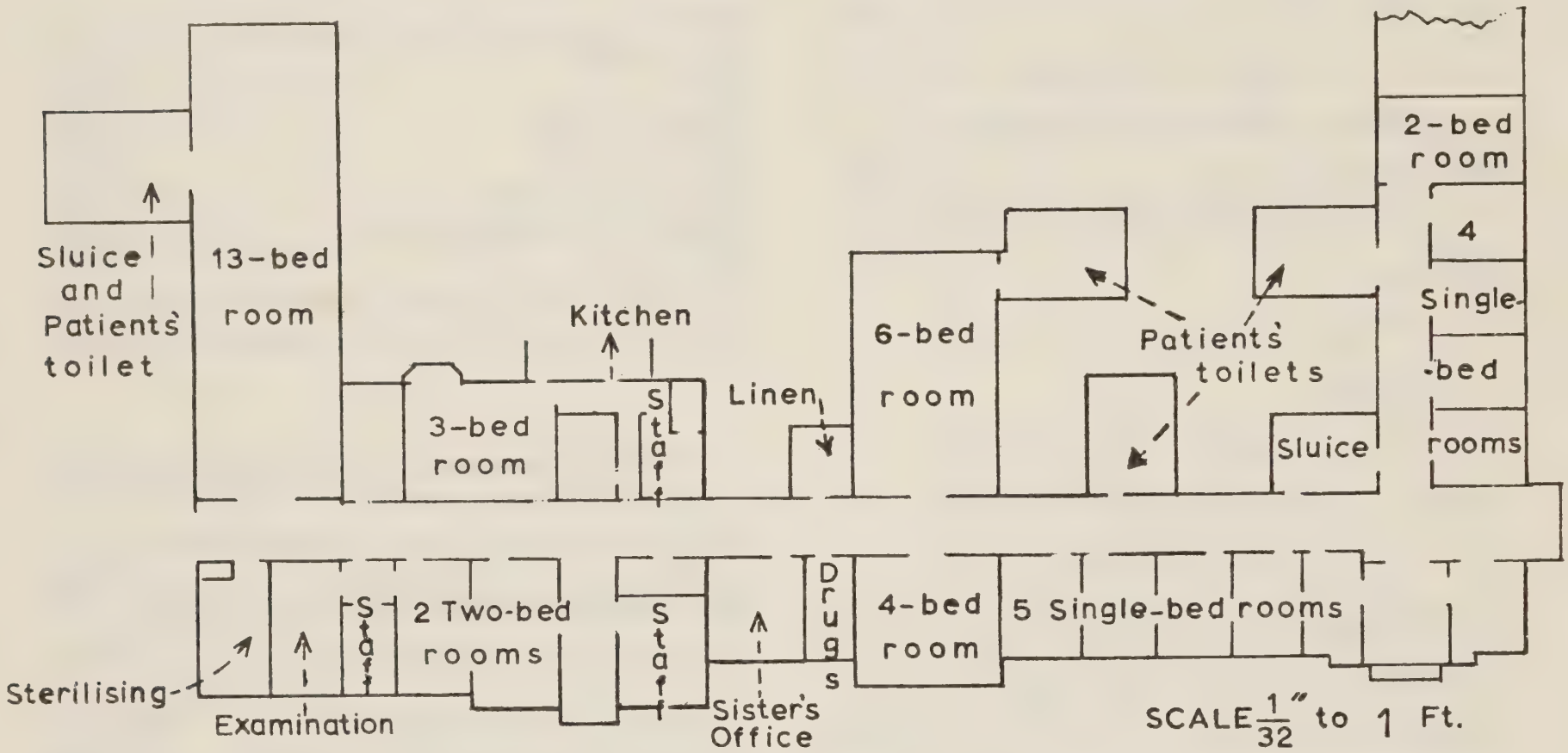


Figure 6.

4. ***Period of observation***

7 a.m. on 9th June, 1964, to 10 p.m. on 11th June, 1964.

5. ***Details of staff and patients***

Average bed occupancy	27·7
Average number of ambulant patients ..	20·3
Average number of nurses on duty 7 a.m. to 10 p.m.	6·5*
Average number of nurses on duty 10 p.m. to 7 a.m.	3·5*
Average daily number of nursing hours per patient	4·6*

* Includes meal breaks.

6. ***Number of calls made by patients***

Total number of calls	37
Calls answered by nurse using 2-way speech facility	34
Calls answered by nurse identifying source by over-door lights in the corridor ..	3
Calls answered on which walking distance/time was saved	22
Calls answered on which no walking distance/time was saved	7
Calls answered on which the patients either failed to reply or failed to make their requirements known	5
Average daily number of calls between 7 a.m. and 10 p.m.	9·3
Average daily number of calls between 10 p.m. and 7 a.m.	4·5
Daily average number of calls	13·8
Average number of calls per hour between 7 a.m. and 10 p.m.	·62
Average number of calls per hour between 10 p.m. and 7 a.m.	·5
Average number of calls per hour	·57
Daily average number of calls per patient	·5

7. ***Time taken to answer patients' calls***

Average time for all calls	8·6 secs.
Average time for calls answered by using 2-way speech facility	8·8 secs.
Average time for calls answered without using 2-way speech facility	5·3 secs.

8. ***Purpose of calls made by patients***

Bedpan, urinal, commode	10·8%
Drug, dressing	21·6%
Diet	—
Attention to bed	—
Drinking water	5·4%
Requiring reassurance	2·7%
Complained of feeling unwell	13·5%
Miscellaneous	46·0%

["Miscellaneous" included requests for opening window, washing hair, bathing, collection of specimen and permission to dress.]

9. ***Number of staff calls (staff to patient or staff to staff calls answered by using 2-way speech facility)***

Total number of calls	123
Total number of staff to patient calls ..	51
Total number of staff to staff calls	72

Total number of calls originated in duty station (sister's office)	85
Total number of calls originated in wards	38
Total number of calls originated by sister ..	32
Total number of calls originated by staff nurses	59
Total number of calls originated by other nursing staff	32
Total number of calls in which person required was contacted	116
Total number of calls in which person required was not contacted	7
Calls answered on which walking distance/time was saved	114
Calls answered on which no walking distance/time was saved	2
Average daily number of all staff calls ..	46·8
Average daily number of staff to patient calls	19·4
Average daily number of staff to staff calls	27·4
Average number of all calls per hour ..	1·95

10. ***Time taken to answer staff calls***

Average time for the 116 calls made successfully	7·6 secs.

11. ***"Nurse presence" indication***

Number of staff to staff calls in which use was not made of this facility ..	44	(35·8%)
Number of staff to staff calls in which this facility was used successfully ..	26	(26·1%)
Number of staff to staff calls in which this facility was not used successfully because the nurse concerned had failed to cancel	2	(1·6%)

12. ***Purpose of calls made by staff***

Student nurse asking for assistance or instructions from sister or staff nurse ..	19·5%
Sister or staff nurse issuing instructions to or seeking information from student nurse	18·7%
Staff nurse asking for assistance or instructions from sister	5·7%
Sister issuing instructions to or seeking information from staff nurse	4·9%
Staff nurse issuing instructions to or seeking information from another staff nurse ..	8·1%
Sister giving information to a physiotherapist	·8%
Staff nurse requesting doctor to visit patient	·8%
Nurses passing on to patients information concerning relatives	13·0%
Staff nurse asking patients' visitors to leave	8·1%
Inquiries addressed to patients by staff nurses or sisters re treatment, specimen, use of bedpan	13·8%
Other messages from staff nurses or sisters to patients concerning diet, discharge, getting up, etc.	6·6%

13. ***Walking distance/time saved by patients' use of auditory system***

Total distance saved by nursing staff during period of observation	807 yds.
Average distance saved daily	307 yds.
Average distance saved by a nurse during each hour of duty	2·3 yds.
Average time saved by a nurse during each hour of duty (assuming walking speed of 4 m.p.h.)	1·2 secs.

14. ***Walking distance/time saved by staff use of auditory system***

Total distance saved by nursing staff during period of observation	5,025 yds.
Average distance saved daily ..	1,914 yds.
Average distance saved by a nurse during each hour of duty	14·1 yds.
Average time saved by a nurse during each hour of duty (assuming walking speed of 4 m.p.h.)	7·2 secs.

15. ***Total walking distance/time saved by use of auditory system (staff and patients' calls)***

Average walking distance saved by nursing staff during each hour of duty ..	16·4 yds.
Average time saved by nursing staff during each hour of duty (assuming walking speed of 4 m.p.h.)	8·4 secs.

Appendix G

(paragraph 32)

Count of patients' calls (auditory system)

1. ***Accommodation***

The ward provided 25 male medical beds (no private patient accommodation) in 5 single rooms, and in 2 two-bed and 4 four-bed bays.

2. ***Main features of call system***

An auditory system with multiple reply points for staff was installed with a hand unit for each bed incorporating, *inter alia*, a speaker/microphone, call push and reassurance light. Calls were indicated by call indicator panels at each reply point and buzzers. Non-auditory call facilities only were provided in bathrooms and w.c.'s. The emergency call facility was included in the system.

3. ***Layout of ward***

4. ***Period of observation***

3 p.m. on 11th March, 1964, to 3 p.m. on 13th March, 1964.

5. ***Details of patients***

Average bed occupancy	19·0
Average number of ambulant patients ..	13·0

6. ***Number of calls made by patients***

Total number of calls	25
Average number of calls between 7.30 a.m. and 8.30 p.m.	11·0
Average number of calls between 8.30 p.m. and 7.30 a.m.	1·5
Average number of calls daily	12·5
Daily average number of calls per patient	·7

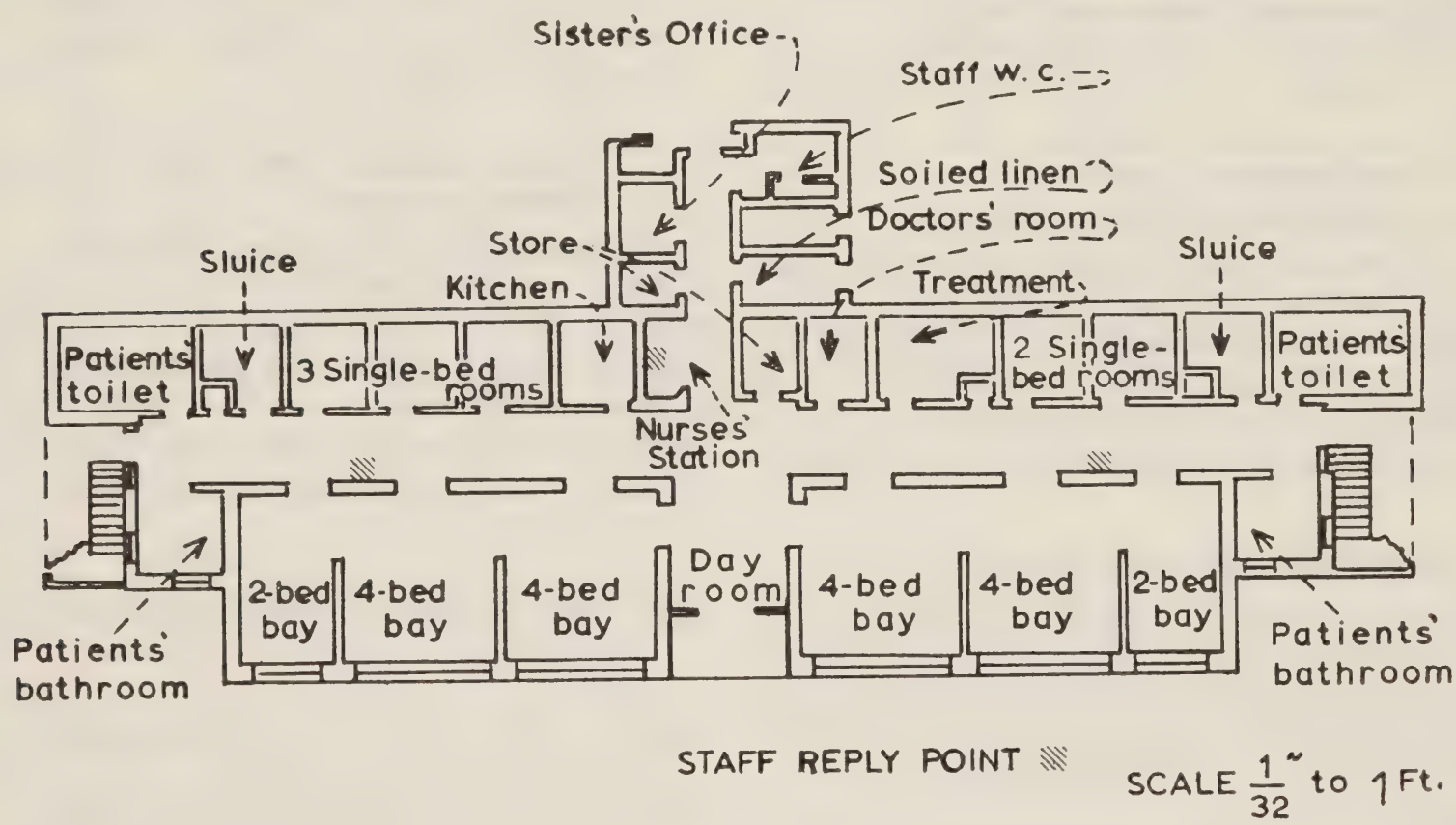


Figure 7.

Appendix H

(paragraph 32)

Count of patients' calls (auditory system)

1. ***Accommodation***

The ward provided 25 female medical beds (no private patient accommodation) in 5 single rooms, and in 2 two-bed and 4 four-bed bays.

2. ***Main features of call system***

An auditory system with multiple reply points for staff was installed with a hand unit for each bed incorporating, *inter alia*, a speaker/microphone, call push and reassurance light. Calls were indicated by call indicator panels at each reply point, and buzzers. Non-auditory call facilities only were provided in bathrooms and w.c.'s. The emergency call facility was included in the system.

3. ***Layout of ward***

4. ***Period of observation***

3 p.m. on 11th March, 1964, to 3 p.m. on 13th March, 1964.

5. ***Details of patients***

Average bed occupancy	15·3
Average number of ambulant patients ..	7·6

6. ***Number of calls made by patients***

Total number of calls	60·0
Average number of calls between 7.30 a.m. and 8.30 p.m.	25·5
Average number of calls between 8.30 p.m. and 7.30 a.m.	4·5
Average number of calls daily	30·0
Daily average number of calls per patient	1·9

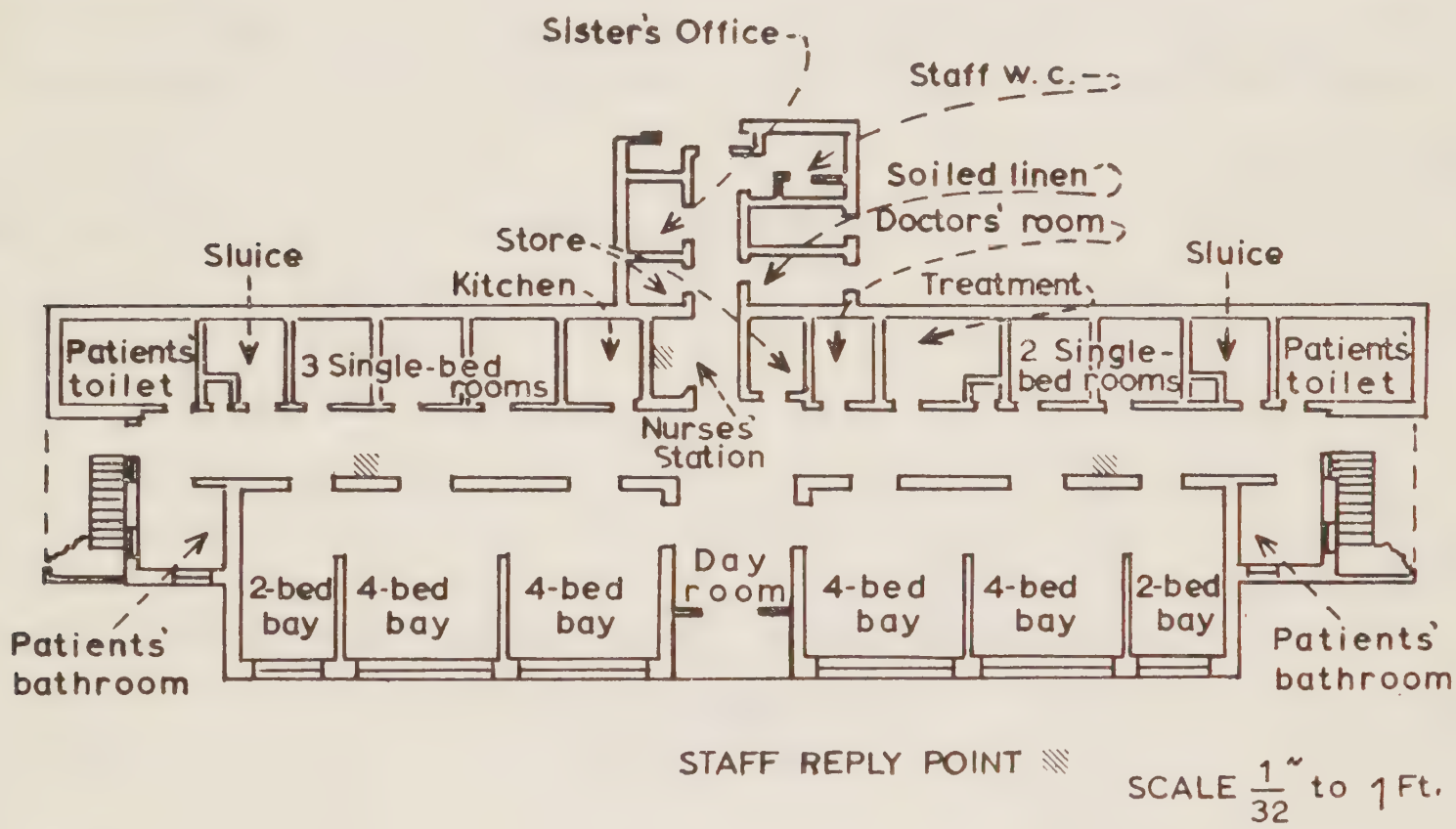


Figure 8.

Appendix I

(paragraph 32)

Count of patients' calls (combined auditory and non-auditory system)

1. ***Accommodation***

The ward provided 23 maternity beds (no private patient accommodation) in two single rooms (labour beds), 1 six-bed bay (ante-natal) and 1 fifteen-bed bay (post-natal).

2. ***Main features of call system***

An auditory system with a single reply point for staff was installed, with each labour and ante-natal bed provided with a speaker/microphone, call push and reassurance light and each post-natal bed with a pear push and reassurance light only. Calls were indicated by the reassurance lights, a buzzer and lights on the plan indicator incorporated in the central control unit which was installed in sister's office. Because of the very short distances between the office and the beds fitted with the 2-way speech facility no use was made of it in practice.

3. ***Layout of ward***

4. ***Period of observation***

8 a.m. on 1st July, 1964, to 8 a.m. on 4th July, 1964.

5. ***Details of patients***

Average bed occupancy	19·8
Average number of ambulant patients (approx.)	13·0

6. ***Number of calls made by patients***

Total number of calls	48
Average number of calls between 8 a.m. and 8 p.m.	8
Average number of calls between 8 p.m. and 8 a.m.	8
Average number of calls daily	16
Daily average number of calls per patient	·8

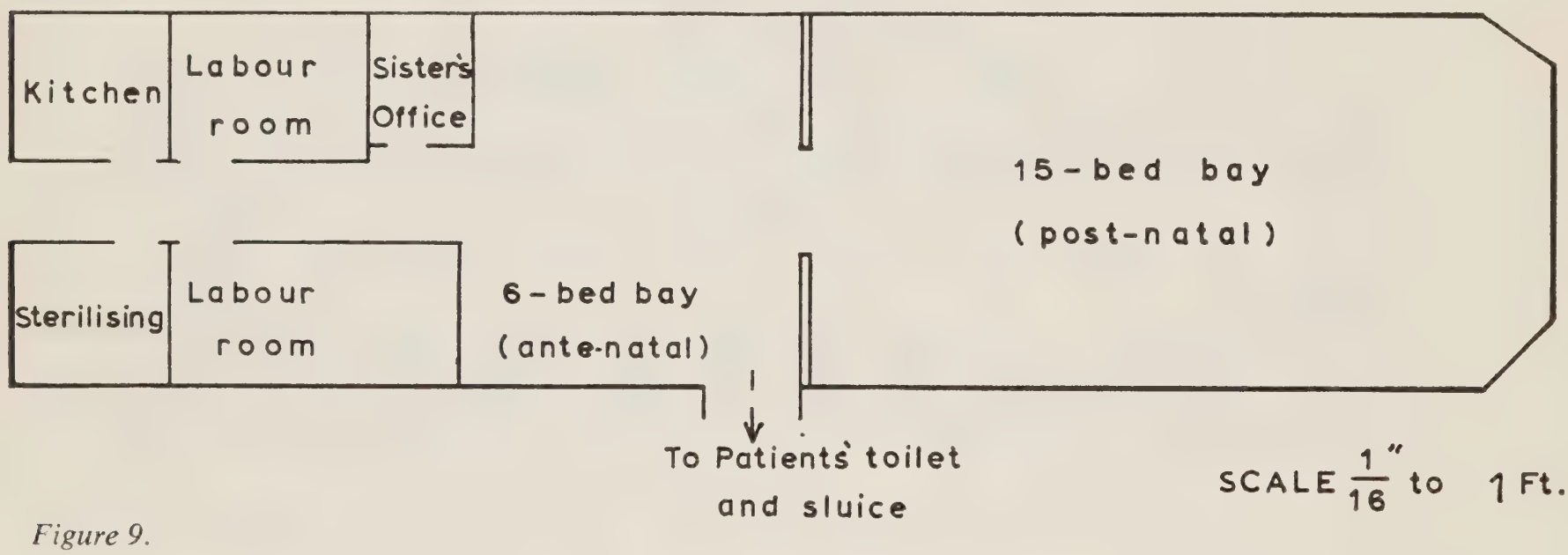


Figure 9.

Appendix J

(paragraph 32)

Count of patients' calls (combined auditory and non-auditory system)

1. ***Accommodation***

The ward provided 25 maternity beds (no private patient accommodation) in 2 single rooms (labour beds), 1 eight-bed bay (ante-natal) and 1 fifteen-bed bay (post-natal).

2. ***Main features of call system***

An auditory system with a single reply point for staff was installed, with each labour and ante-natal bed provided with a speaker/microphone, call push and reassurance light and each post-natal bed with a pear push and reassurance light only. Calls were indicated by the reassurance lights, a buzzer and lights in the plan indicator incorporated in the central control unit which was installed in sister's office. Because of the very short distances between the office and the beds fitted with the 2-way speech facility no use was made of it in practice.

3. ***Layout of ward***

4. ***Period of observation***

8 a.m. on 1st July, 1964, to 8 a.m. on 4th July, 1964.

5. ***Details of patients***

Average bed occupancy	21·7
Average number of ambulant patients (approx.)	14·0

6. ***Number of calls made by patients***

Total number of calls	41
Average number of calls between 8 a.m. and 8 p.m.	6·3
Average number of calls between 8 p.m. and 8 a.m.	7·3
Average number of calls daily	13·6
Daily average number of calls per patient	·7

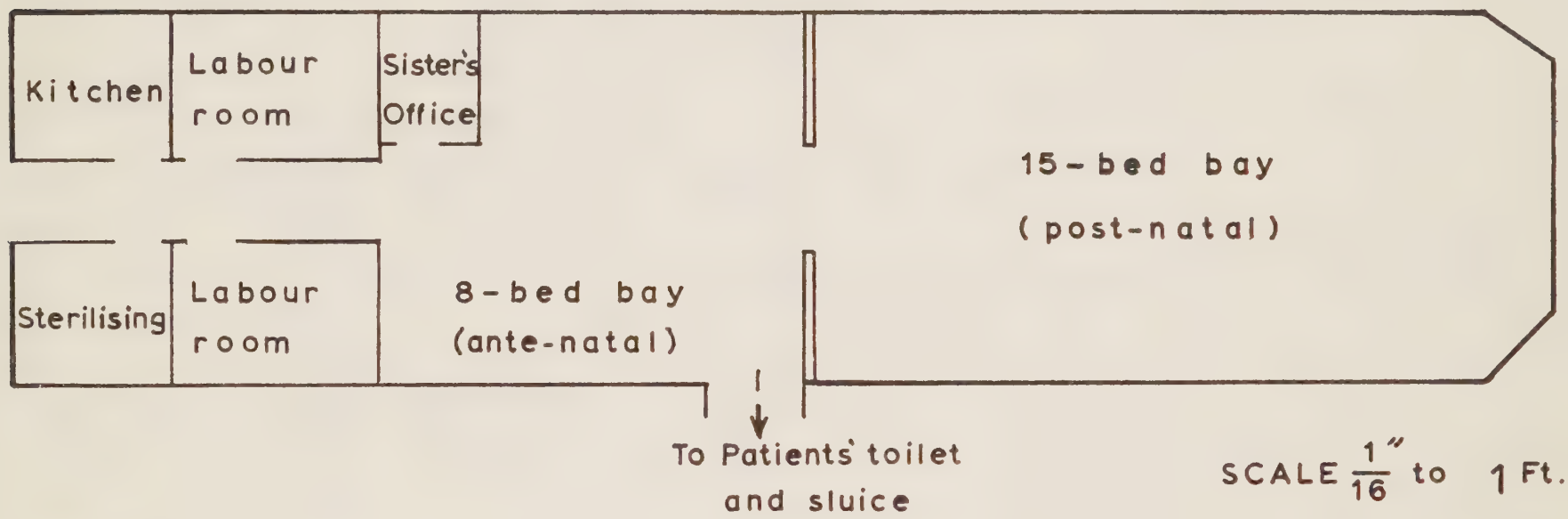


Figure 10.

Appendix K

(paragraph 32)

Count of patients' calls (non-auditory system)

1. ***Accommodation***

The ward provided 32 maternity beds (no private patient accommodation) in 4 single (2 labour, 2 ante-natal), 2 two-bed, 1 three-bed, 1 six-bed (all ante-natal) and 1 fifteen-bed (post-natal) rooms.

2. ***Main features of call system***

A non-auditory system was installed with a call push at each bed. Calls were indicated by over-door lights and a buzzer, and there was a call indicator panel at the nursing station.

3. ***Layout of ward***

4. ***Period of observation***

8 a.m. on 1st July, 1964, to 8 a.m. on 4th July, 1964.

5. ***Details of patients***

Average bed occupancy	28·8
Average number of ambulant patients (approx.)	19·0

6. ***Number of calls made by patients***

Total number of calls	82
Average number of calls between 8 a.m. and 8 p.m.	8·3
Average number of calls between 8 p.m. and 8 a.m.	19·0
Average number of calls daily	27·3
Daily average number of calls per patient ..	·9

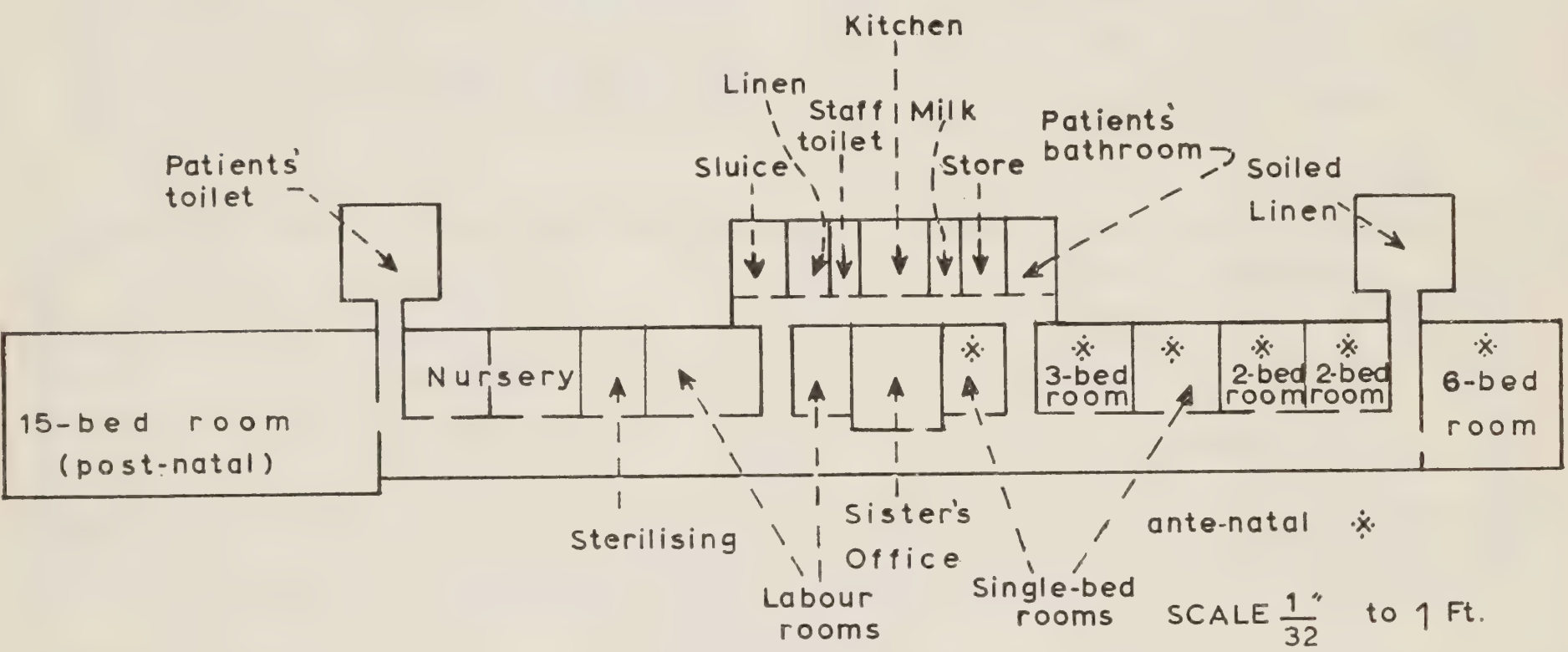
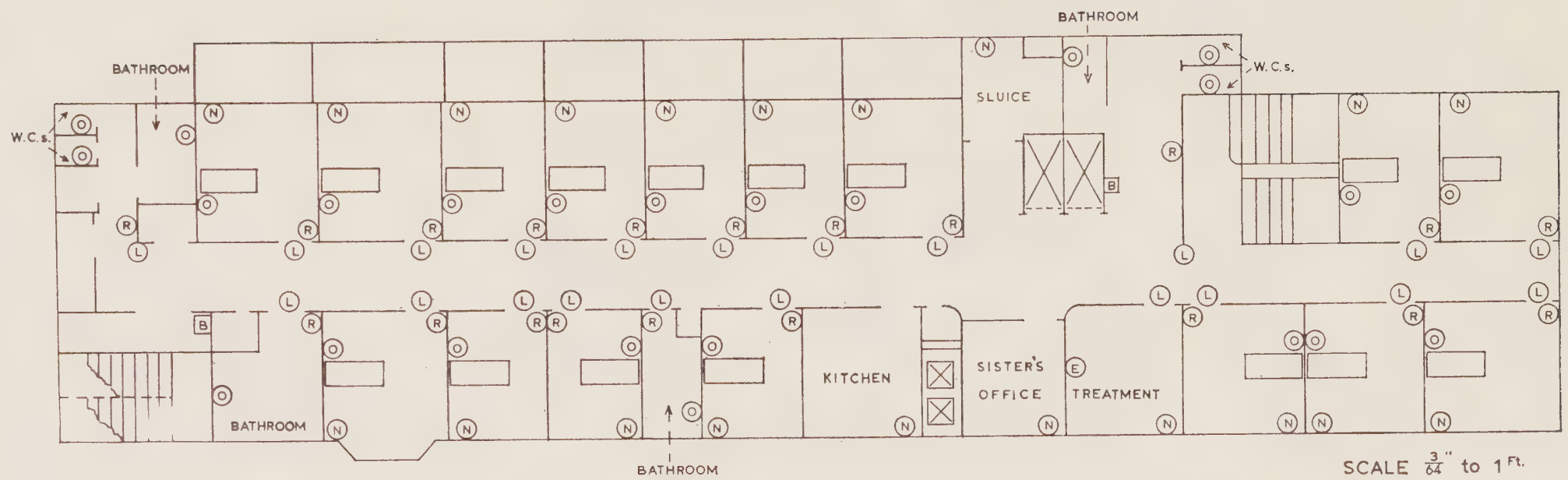


Figure 11.

Appendix L

(paragraph 89)

Siting of the recommended non-auditory call system in the 16-bed lineally planned ward referred to in Appendix C



KEY

- (O) Patients' call push, reassurance light, and combined emergency call and reset push
- (R) Normal call reset push
- (E) Emergency call and reset push
- (L) Over-door light
- [B] Buzzer
- (N) Night call indicator light

Figure 12.

Appendix M

(paragraph 89)

Siting of the recommended non-auditory call system in a 31-bed ward planned in depth (plan copied from the Ward Planning Handbook of the South-West Metropolitan Regional Hospital Board)

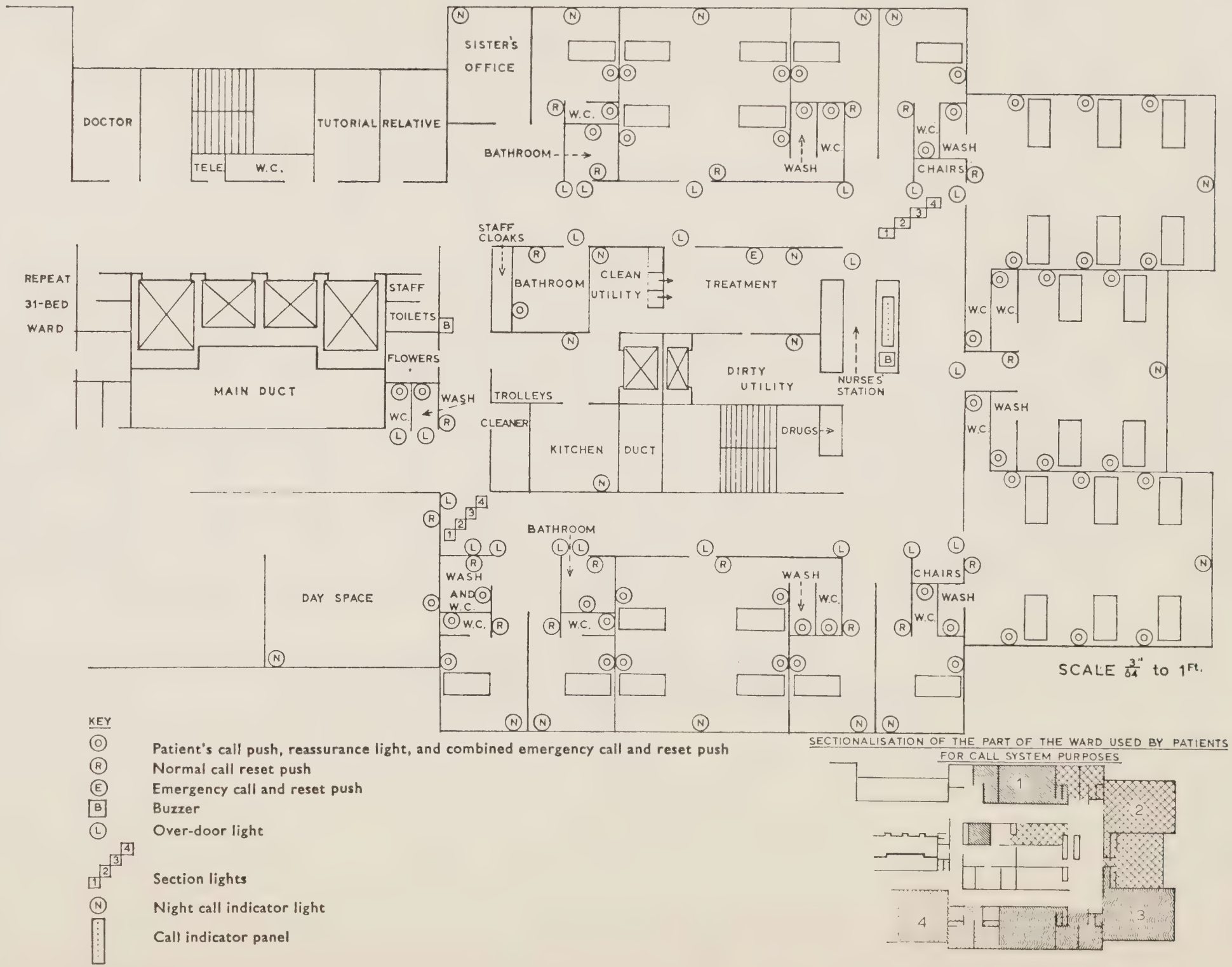


Figure 13.

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